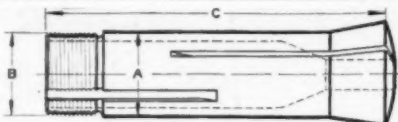


Hitchcock's Machine Tool Blue Book

DECEMBER, 1935

THIRTIETH YEAR



COLLET NUMBER FOR YOUR ORDER MAY BE SELECTED FROM THIS LIST OF STANDARD COLLETS

HARDINGE COLLETS

Ames No. 1 Capacity	1A Hardinge	1.00	1 1/2-24 H.H.	1 1/2	53.50	62.00
Ames No. 2 Capacity	1A Hardinge	1.125	1 1/2-24 H.H.	1 1/2	1.25	6.25
Becker No. 1	1B Hardinge	1.50	3/4-20 H.H.	1 1/2	3.00	5.00
Becker No. 2	2B Hardinge	2.00	1/2-20 H.H.	2 1/2	3.50	5.50
Becker No. 2A	2AB Hardinge	2.50	3/8-20 H.H.	2 1/2	4.00	6.00
Becker No. 3	3B Hardinge	3.00	5/16-18 H.H.	3 1/2	4.50	6.50
Caterpillar No. 1	1C Hardinge	3.00	3/8-20 H.H.	1 1/2	2.75	4.75
Caterpillar No. 2	2C Hardinge	3.50	1/2-20 H.H.	1 1/2	3.00	5.00
Caterpillar No. 3	3C Hardinge	4.00	5/16-18 H.H.	2 1/2	3.50	5.50
Caterpillar No. 4	4C Hardinge	4.50	3/8-20 H.H.	3 1/2	4.00	6.00
Caterpillar No. 5	5C Hardinge	5.00	1/2-20 H.H.	4 1/2	5.50	7.50
Caterpillar No. 6	6C Hardinge	5.50	5/16-18 H.H.	5 1/2	6.00	8.00
Caterpillar No. 7	7C Hardinge	6.00	3/8-20 H.H.	6 1/2	6.50	8.50
Caterpillar No. 8	8C Hardinge	6.50	1/2-20 H.H.	7 1/2	7.00	9.00
Caterpillar No. 9	9C Hardinge	7.00	5/16-18 H.H.	8 1/2	7.50	9.50
Caterpillar No. 10	10C Hardinge	7.50	3/8-20 H.H.	9 1/2	8.00	10.00
Caterpillar No. 11	11C Hardinge	8.00	1/2-20 H.H.	10 1/2	8.50	10.50
Caterpillar No. 12	12C Hardinge	8.50	5/16-18 H.H.	11 1/2	9.00	11.00
Caterpillar No. 13	13C Hardinge	9.00	3/8-20 H.H.	12 1/2	9.50	11.50
Caterpillar No. 14	14C Hardinge	9.50	1/2-20 H.H.	13 1/2	10.00	12.00
Caterpillar No. 15	15C Hardinge	10.00	5/16-18 H.H.	14 1/2	10.50	12.50
Caterpillar No. 16	16C Hardinge	10.50	3/8-20 H.H.	15 1/2	11.00	13.00
Caterpillar No. 17	17C Hardinge	11.00	1/2-20 H.H.	16 1/2	11.50	13.50
Caterpillar No. 18	18C Hardinge	11.50	5/16-18 H.H.	17 1/2	12.00	14.00
Caterpillar No. 19	19C Hardinge	12.00	3/8-20 H.H.	18 1/2	12.50	14.50
Caterpillar No. 20	20C Hardinge	12.50	1/2-20 H.H.	19 1/2	13.00	15.00
Caterpillar No. 21	21C Hardinge	13.00	5/16-18 H.H.	20 1/2	13.50	15.50
Caterpillar No. 22	22C Hardinge	13.50	3/8-20 H.H.	21 1/2	14.00	16.00
Caterpillar No. 23	23C Hardinge	14.00	1/2-20 H.H.	22 1/2	14.50	16.50
Caterpillar No. 24	24C Hardinge	14.50	5/16-18 H.H.	23 1/2	15.00	17.00
Caterpillar No. 25	25C Hardinge	15.00	3/8-20 H.H.	24 1/2	15.50	17.50
Caterpillar No. 26	26C Hardinge	15.50	1/2-20 H.H.	25 1/2	16.00	18.00
Caterpillar No. 27	27C Hardinge	16.00	5/16-18 H.H.	26 1/2	16.50	18.50
Caterpillar No. 28	28C Hardinge	16.50	3/8-20 H.H.	27 1/2	17.00	19.00
Caterpillar No. 29	29C Hardinge	17.00	1/2-20 H.H.	28 1/2	17.50	19.50
Caterpillar No. 30	30C Hardinge	17.50	5/16-18 H.H.	29 1/2	18.00	20.00
Caterpillar No. 31	31C Hardinge	18.00	3/8-20 H.H.	30 1/2	18.50	20.50
Caterpillar No. 32	32C Hardinge	18.50	1/2-20 H.H.	31 1/2	19.00	21.00
Caterpillar No. 33	33C Hardinge	19.00	5/16-18 H.H.	32 1/2	19.50	21.50
Caterpillar No. 34	34C Hardinge	19.50	3/8-20 H.H.	33 1/2	20.00	22.00
Caterpillar No. 35	35C Hardinge	20.00	1/2-20 H.H.	34 1/2	20.50	22.50
Caterpillar No. 36	36C Hardinge	20.50	5/16-18 H.H.	35 1/2	21.00	23.00
Caterpillar No. 37	37C Hardinge	21.00	3/8-20 H.H.	36 1/2	21.50	23.50
Caterpillar No. 38	38C Hardinge	21.50	1/2-20 H.H.	37 1/2	22.00	24.00
Caterpillar No. 39	39C Hardinge	22.00	5/16-18 H.H.	38 1/2	22.50	24.50
Caterpillar No. 40	40C Hardinge	22.50	3/8-20 H.H.	39 1/2	23.00	25.00
Caterpillar No. 41	41C Hardinge	23.00	1/2-20 H.H.	40 1/2	23.50	25.50
Caterpillar No. 42	42C Hardinge	23.50	5/16-18 H.H.	41 1/2	24.00	26.00
Caterpillar No. 43	43C Hardinge	24.00	3/8-20 H.H.	42 1/2	24.50	26.50
Caterpillar No. 44	44C Hardinge	24.50	1/2-20 H.H.	43 1/2	25.00	27.00
Caterpillar No. 45	45C Hardinge	25.00	5/16-18 H.H.	44 1/2	25.50	27.50
Caterpillar No. 46	46C Hardinge	25.50	3/8-20 H.H.	45 1/2	26.00	28.00
Caterpillar No. 47	47C Hardinge	26.00	1/2-20 H.H.	46 1/2	26.50	28.50
Caterpillar No. 48	48C Hardinge	26.50	5/16-18 H.H.	47 1/2	27.00	29.00
Caterpillar No. 49	49C Hardinge	27.00	3/8-20 H.H.	48 1/2	27.50	29.50
Caterpillar No. 50	50C Hardinge	27.50	1/2-20 H.H.	49 1/2	28.00	30.00
Caterpillar No. 51	51C Hardinge	28.00	5/16-18 H.H.	50 1/2	28.50	30.50
Caterpillar No. 52	52C Hardinge	28.50	3/8-20 H.H.	51 1/2	29.00	31.00
Caterpillar No. 53	53C Hardinge	29.00	1/2-20 H.H.	52 1/2	29.50	31.50
Caterpillar No. 54	54C Hardinge	29.50	5/16-18 H.H.	53 1/2	30.00	32.00
Caterpillar No. 55	55C Hardinge	30.00	3/8-20 H.H.	54 1/2	30.50	32.50
Caterpillar No. 56	56C Hardinge	30.50	1/2-20 H.H.	55 1/2	31.00	33.00
Caterpillar No. 57	57C Hardinge	31.00	5/16-18 H.H.	56 1/2	31.50	33.50
Caterpillar No. 58	58C Hardinge	31.50	3/8-20 H.H.	57 1/2	32.00	34.00
Caterpillar No. 59	59C Hardinge	32.00	1/2-20 H.H.	58 1/2	32.50	34.50
Caterpillar No. 60	60C Hardinge	32.50	5/16-18 H.H.	59 1/2	33.00	35.00
Caterpillar No. 61	61C Hardinge	33.00	3/8-20 H.H.	60 1/2	33.50	35.50
Caterpillar No. 62	62C Hardinge	33.50	1/2-20 H.H.	61 1/2	34.00	36.00
Caterpillar No. 63	63C Hardinge	34.00	5/16-18 H.H.	62 1/2	34.50	36.50
Caterpillar No. 64	64C Hardinge	34.50	3/8-20 H.H.	63 1/2	35.00	37.00
Caterpillar No. 65	65C Hardinge	35.00	1/2-20 H.H.	64 1/2	35.50	37.50
Caterpillar No. 66	66C Hardinge	35.50	5/16-18 H.H.	65 1/2	36.00	38.00
Caterpillar No. 67	67C Hardinge	36.00	3/8-20 H.H.	66 1/2	36.50	38.50
Caterpillar No. 68	68C Hardinge	36.50	1/2-20 H.H.	67 1/2	37.00	39.00
Caterpillar No. 69	69C Hardinge	37.00	5/16-18 H.H.	68 1/2	37.50	39.50
Caterpillar No. 70	70C Hardinge	37.50	3/8-20 H.H.	69 1/2	38.00	40.00
Caterpillar No. 71	71C Hardinge	38.00	1/2-20 H.H.	70 1/2	38.50	40.50
Caterpillar No. 72	72C Hardinge	38.50	5/16-18 H.H.	71 1/2	39.00	41.00
Caterpillar No. 73	73C Hardinge	39.00	3/8-20 H.H.	72 1/2	39.50	41.50
Caterpillar No. 74	74C Hardinge	39.50	1/2-20 H.H.	73 1/2	40.00	42.00
Caterpillar No. 75	75C Hardinge	40.00	5/16-18 H.H.	74 1/2	40.50	42.50
Caterpillar No. 76	76C Hardinge	40.50	3/8-20 H.H.	75 1/2	41.00	43.00
Caterpillar No. 77	77C Hardinge	41.00	1/2-20 H.H.	76 1/2	41.50	43.50
Caterpillar No. 78	78C Hardinge	41.50	5/16-18 H.H.	77 1/2	42.00	44.00
Caterpillar No. 79	79C Hardinge	42.00	3/8-20 H.H.	78 1/2	42.50	44.50
Caterpillar No. 80	80C Hardinge	42.50	1/2-20 H.H.	79 1/2	43.00	45.00
Caterpillar No. 81	81C Hardinge	43.00	5/16-18 H.H.	80 1/2	43.50	45.50
Caterpillar No. 82	82C Hardinge	43.50	3/8-20 H.H.	81 1/2	44.00	46.00
Caterpillar No. 83	83C Hardinge	44.00	1/2-20 H.H.	82 1/2	44.50	46.50
Caterpillar No. 84	84C Hardinge	44.50	5/16-18 H.H.	83 1/2	45.00	47.00
Caterpillar No. 85	85C Hardinge	45.00	3/8-20 H.H.	84 1/2	45.50	47.50
Caterpillar No. 86	86C Hardinge	45.50	1/2-20 H.H.	85 1/2	46.00	48.00
Caterpillar No. 87	87C Hardinge	46.00	5/16-18 H.H.	86 1/2	46.50	48.50
Caterpillar No. 88	88C Hardinge	46.50	3/8-20 H.H.	87 1/2	47.00	49.00
Caterpillar No. 89	89C Hardinge	47.00	1/2-20 H.H.	88 1/2	47.50	49.50
Caterpillar No. 90	90C Hardinge	47.50	5/16-18 H.H.	89 1/2	48.00	50.00
Caterpillar No. 91	91C Hardinge	48.00	3/8-20 H.H.	90 1/2	48.50	50.50
Caterpillar No. 92	92C Hardinge	48.50	1/2-20 H.H.	91 1/2	49.00	51.00
Caterpillar No. 93	93C Hardinge	49.00	5/16-18 H.H.	92 1/2	49.50	51.50
Caterpillar No. 94	94C Hardinge	49.50	3/8-20 H.H.	93 1/2	50.00	52.00
Caterpillar No. 95	95C Hardinge	50.00	1/2-20 H.H.	94 1/2	50.50	52.50
Caterpillar No. 96	96C Hardinge	50.50	5/16-18 H.H.	95 1/2	51.00	53.00
Caterpillar No. 97	97C Hardinge	51.00	3/8-20 H.H.	96 1/2	51.50	53.50
Caterpillar No. 98	98C Hardinge	51.50	1/2-20 H.H.	97 1/2	52.00	54.00
Caterpillar No. 99	99C Hardinge	52.00	5/16-18 H.H.	98 1/2	52.50	54.50
Caterpillar No. 100	100C Hardinge	52.50	3/8-20 H.H.	99 1/2	53.00	55.00

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Simply constructed,
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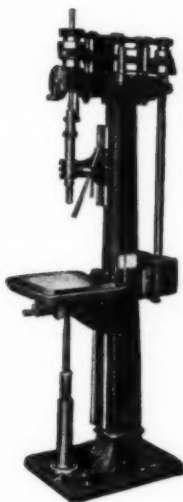


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A Single Spindle Footburt Sipp Sensitive Drill

**Made in three
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spindle models**

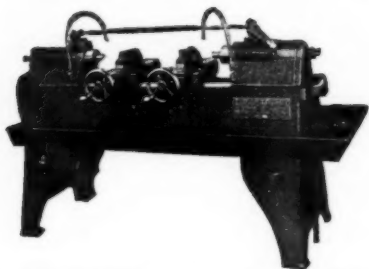
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CENTERING MACHINES

For drilling, reaming, tapping, countersinking and similar operations;

on one end or both ends at once. No. 56 shown. Others available. Accurate. Fast.



BALANCING TOOLS

Made in 5 sizes, with capacities from 800 lbs. to 24,000 lbs. Others for propellers, flywheels, pulleys, etc.

BENCH CENTERS

* Accurate, compact, portable. Adjustable heads. Quick-acting spindle. Seven sizes.



These Sundstrand tools, like our Lathes and Milling Machines, cut costs and make work easier. • • •
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**Machine Tool
Blue Book**

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DECEMBER, 1935

THIRTIETH YEAR

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20,000 +
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Brings Results**

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These low prices will prevail only until the present overstock has been sold. Take advantage of this money saving opportunity.

These machines will handle the large difficult Drilling and Boring jobs easily—and the average run of work very efficiently. They are available in two types and three sizes — with all attachments. You can select the machine fitted to your particular work. *Write today for a complete description, specifications and prices.*

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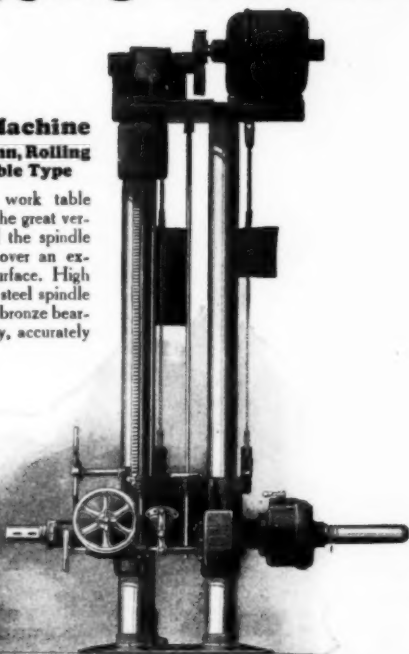
Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee,
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No. 1 Machine Fixed Column, Rolling Work Table Type

The movable work table together with the great vertical travel of the spindle permits work over an extremely large surface. High carbon forged steel spindle carried in long bronze bearings in a heavy, accurately fitted sleeve.



Ryerson Machinery also includes Combination Shear, Punch and Copers in a full range of sizes, Serpentine Shears, Friction Saws, Punches, Angle and Plate rolls; Bar, Angle, Plate and Sheet Shears, Bulldozers, Lathes, etc. WRITE FOR DESCRIPTIVE LITERATURE.

MACHINE TOOL PRODUCTION GREATLY INCREASED

Due to the revival of confidence in the industrial outlook, a decided improvement has made itself felt during the first nine months of 1935 in industrial machinery and machine tool manufacturing, according to a new survey issued by Poor's Publishing Company. We quote from the survey:

"The low rate of industrial activity during the last few years restricted installation of new machinery of all kinds. Moreover, the financial strain and general discouragement generated practices such as stripping idle machinery for repair parts, and running obsolete machinery long after it should have been junked. New developments and new designs created by the industrial machinery industry in an effort to break the deadlock have hastened obsolescence still more. There is no doubt as to the magnitude of the potential demand for industrial machinery. Purchases by manufacturers of business machines, farm equipment, household products, oil well supplies, and machine tools are increasing.

"Machine tool orders are probably the best barometer for indicating activity within the entire industrial machinery industry, although the machine tool division accounts for only 2% to 3% of the total industrial equipment business. The index of machine tool orders (1926 = 100) reached its peak of 186.3 in February, 1929 and fell to a low of 7.4 in March, 1933. In 1934, the monthly index of machine tool orders rose to 46.2 due to replacement purchases of machinery. But it remained for 1935 to witness a gathering momentum which sent the index to 125.8 in August.

"The machine tool industry considers 50% replacement and 50% new business the normal ratio of orders. The current ratio is 65% for replacement and 35% new business. According to trade estimates, maintenance of this ratio for the next 5 years should result in sufficient business to hold the index to 107. It is further estimated that a return to the 50-50 ratio would push the index up to 170. Whether purchases of new equipment will expand to this extent will depend upon how strongly manufacturers regain confidence in the future."

(Continued on Page 10)

ATLAS DRILL PRESS DOES 5 HOUR JOB IN 2 HOURS

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The Reynolds Electric Company, prominent electrical product manufacturers of Chicago, find Atlas Drill Press equipment efficient and economical. Manufacturing steel switch parts, they are tapping between eighteen hundred and two thousand 9-36 threads per hour with an Atlas Model 70. The press is running full time, eight hours a day. Its purchase represented a very large saving, the price being only a fraction of other equipment considered. On this same Atlas, Reynolds is now doing in two hours a tap job that formerly required five hours on a regular tapping outfit.

Atlas Drill Presses are standing up under this and many other similar jobs and maintaining their accuracy. They will do the same in your plant. Made in four sizes, bench and floor models. Prices range from \$14.45 to \$39.45. *See them at your jobbers or write direct for new 1936 catalog of LATHES and DRILLS.*

ATLAS PRESS COMPANY

1850 N. Pitcher St., Kalamazoo, Mich.

Complete display at Atlas Sales Co., 35 E. Wacker Dr., Chicago

NEW GROB OPEN END BAND SAW

The newest addition to the line of Grob continuous motion filing machines is their open end band saw, the outstanding feature of which is the speed and ease with which it does internal sawing. The principle of the machine is the winding up of a 150 foot long saw band helically over a drum and looping it over three guide sheaves, arrangements for forward motion at cutting speeds, reverse motion at high speed, and facilities for quick set-ups to do internal sawing.

To saw out a die it is only necessary to release the tension on the saw band, which is done by a single lever movement, remove the front end of the band fastened with a self-tightening eccentric clamp to the drum, insert it in an opening in the die large enough for the band to pass through, reconnect it to the drum and put tension on the band. The time required to do this is about half a minute and the machine is ready for sawing. Three minutes of sawing can be done at the lowest cutting speed until the end of the band has been reached, at which time the machine will automatically stop. Only 18 seconds is required for the return of the band to be ready for another 3 minutes of sawing.

All revolving members are made of aluminum and the light weight makes a high reverse speed possible as also a quick stop. A positive stop is obtained by means of a limit switch and a brake to the drum. Band saws used are .025" heavy, $\frac{1}{8}$, $\frac{3}{16}$ or $\frac{1}{4}$ " wide and 150 ft. long. The machine has four cutting speeds, 50, 75, 100 and 150 ft. per minute to the saw band, and one reverse speed 500 ft. per minute. It is electrically controlled, push buttons being



(Continued on Page 12)

Rolling Out PROFITS

That's the story—wherever Buffalo Bending Rolls are installed—they're MAKING money for their user!



And remember—it's not our story—it's the user's story!

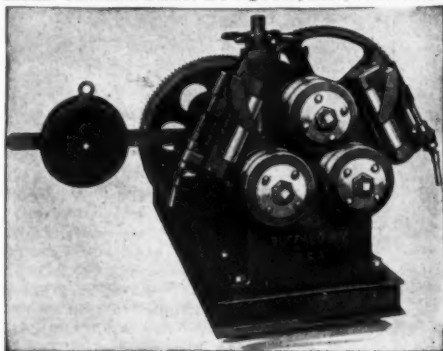
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In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

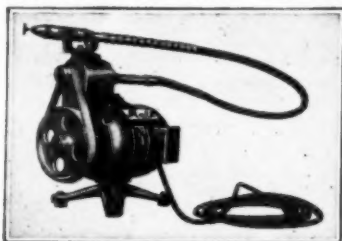


"Buffalo" Bending ROLLS

conveniently placed within reach of the operator, and can be set to reverse itself automatically.

The 24"x28" sawing table is tiltable in 2 directions in such a way that the height of the center of the table does not change. This arrangement allows the saw band guide below the table to come flush with the surface of the table. This maximum rigidity is obtained while sawing. The throat is 25½" and material up to 9" in height can be sawed. The saw is completely guarded with swinging doors and removable cover. The total weight is 2000 lbs. and overall height is 74". More complete and detailed information regarding this new saw may be obtained by writing directly to Grob Brothers, West Allis, Wisconsin.

NEW FLEXIBLE SHAFT MACHINE



A powerful, one-half horsepower continuous duty ball bearing, countershaft driven, flexible shaft machine, equipped with speed combinations for any particular grinding or cutting application, has been recently introduced by the Mall Tool Company, 7740 South Chicago Avenue, Chicago, Ill.

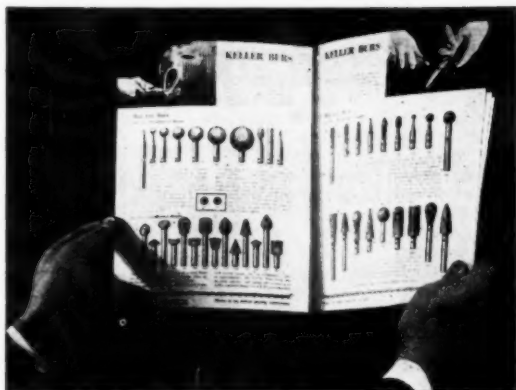
Speeds varying from 850 to 14,000 rpm can be secured.

This high quality tool can be fitted with rotary files or shaped grinding wheels for cutting hard or soft materials. Brass, bronze, aluminum, porcelain, glass, hardened or soft steel, and rubber can be cut with equal efficiency. This tool is recommended for use in die shops, pattern shops, potteries, glass factories, tool rooms, foundries, and numerous other industrial plants for hundreds of applications.

The price is unusually low. Nothing on the market can equal this tool for value, performance, or price.

Additional information and prices will be furnished by writing direct to the manufacturer.

(Continued on Page 14)



SEND FOR THIS BOOK ON KELLER BURS AND ROTARY FILES !

Listed in this 12-page book are burs for almost any requirements, involving fine, medium and coarse cuts, extra fine and extra coarse cuts, rasps, herringbone cuts and others. These tools do a better job than hand files, with a fraction of the effort. They reach the otherwise inaccessible places. They are used on a wide variety of metals and non-metallic substances, by almost every industry. Tell us your finishing problems, and let us send you this book.

PRATT & WHITNEY CO.
HARTFORD, CONN.
KELLER DIVISION

THE NEW HARDINGE MD5 PRECISION MILLING MACHINE

Hardinge Brothers, Inc., Elmira, New York, are placing on the market their new MD5 Precision Milling Machine designed to meet a definite need in the tool room and laboratory. The construction, along modern lines, combines ruggedness with extreme accuracy for ease of operation.

Features of the MD5 include: high spindle speeds, six speeds forward—six speeds reverse—120 to 1190 RPM; compact dimensions with features for ease of operation, a combination to make a responsive time saver in milling operations; feed screws revolve in long adjustable nuts and have friction dials graduated to thousandths of an inch; enclosed headstock has "connected bearing" design — adapting 1" capacity collets and having ball thrust draw spindle; properly proportioned table, knee and saddle, with positive locks and adjustable stops; sturdy table with large working surface, with three slots for T-bolts to take attachments and fixtures; knee section fully enclosed around vertical feed screw bevel gears to exclude dirt and chips; enclosed vee belt drive with conveniently located lever speed control—driving unit does not employ gears, clutches or loose pulleys.

The size of the table, including oil pockets and channels is 24"x6", working surface is 20"x6", 3 T-slots $\frac{7}{16}$ " wide. Range is 13 $\frac{3}{4}$ " longitudinal, 6" transverse, 7" vertical. Distance from center of spindle to table in lowest position, 7". The spindle is of best grade ball bearing steel, hardened and ground—adapting standard 5C Hardinge collets, capacity 1". Arbor is $\frac{7}{8}$ " in diameter, 7" long with spacers and nut. Overhanging arm of arbor support is made of solid steel. Distance from center of spindle to underside of arm, 4". Greatest distance from end of spindle to bronze



(Continued on Page 16)

THE LAST WORD IN ADVANCED GRINDERS

Setting new standards of efficiency, convenience and safety, this new complete line of Delta Grinders is something radically better than any grinder ever before presented. Wheels are balanced to within 1/100 of an ounce-inch. The new Twin-Lite safety shields offer perfect vision on each side and the face of the wheels, double steel ball-bearings are lubricated for life. Accurate tool supports, adjustable spark guards, swinging water pots—every feature has been considered to make these grinders the most efficient, yet developed for all-around shop work. And best of all they are priced amazingly low.

SPECIFICATIONS

WHEELS: Highest grade 7 in. Carborundum, precision balanced. $\frac{3}{4}$ in. face $\frac{5}{8}$ in. hole. 60 grit, grades J & K.

SAFETY SHIELDS: Safety Glass. Two bakelite sockets in each shield for bayonet base bulbs. Armored cable. Toggle switch wired to lamps.

GUARDS: Wheel guards meet all safety codes. Built-in dust chute. Adjustable spark guards.

TOOL SUPPORTS: Fully adjustable, permitting grinding on both sides and face of wheel. Precision-machined.

WATER POT: On swing bracket (bench models) or built-in (pedestal model). Ample size. Instantly detachable.

BEARINGS: Precision double-seal New Departure ball bearings. Lubricated for life.

BODY: Heavy, well-proportioned cast iron. Extended end housings provide plenty of room around wheels.

MOTOR: One-third H. P. 3450 R. P. M. built-in motor standard equipment on motor-driven bench model. Pedestal model, either one-third H. P., single phase or one-half H. P. three phase, 3450 R. P. M.

Available in three different styles—belt-driven, motor-driven, and pedestal models, every one offering the same exacting specifications and the same exclusive features.

Delta Mfg. Co.

For name of nearest Delta dealer, full details, description, prices, write to the Delta Manufacturing Co., 602 East Vienna Ave., Milwaukee, Wisc.



bushing in arbor support, 10¼". Standard equipment includes index head, tailstock, swivel vise, overarm support, ball thrust draw spindle, 7/8" arbor and necessary wrenches. Weight is 825 lbs.

Complete information may be obtained by writing to Hardinge Brothers, Inc., and asking for Bulletin MD5.

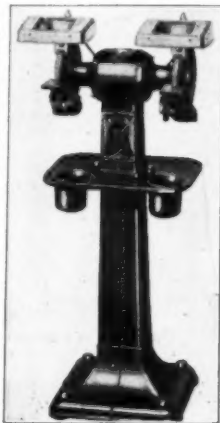
DELTA ANNOUNCES NEW LINE OF ADVANCED GRINDERS

Designed to be completely self-contained, a new line of 7-inch general-purpose grinders announced by the Delta Manufacturing Company, Milwaukee, Wis., incorporates a number of unusual features.

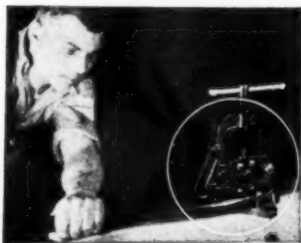
They are offered in three models: a pedestal model for the general machine shop, tool room and school shop, available with either single-phase or three-phase motor; a bench model with single-phase motor, and a belt-driven model, incorporating all the advantages and features of the motor-driven models, for shops in districts where the voltage and phase is not standard, and where it is more convenient to belt the machine to an existing motor or drive.

Single-phase motors on the pedestal model may be equipped either with plain toggle switch, or with push-button overload relay switch. Three-phase model is equipped with relay switch as standard.

One of the most unusual features of the new machine is the Twin-Lite Safety Shield, which not only completely protects the operator's eyes from flying particles of abrasive, but also incorporates a lighting system that makes the grinder completely self-contained, completely portable, and independent of the shop lighting system. Each shield is equipped for a lamp bulb on each side of the safety-glass shield. These lamps, while casting no glare in the operator's eyes, illuminate both sides and face of the grinding wheel, thus remedying a poor lighting condition that is



(Continued on Page 18)



VICES—that have extra tool features...

- If you are used to taking pipe vises for granted, stop, look and listen.
- Pipe vises are usually plain substantial devices for holding pipe, but **RIGID** Vises are much more than that.
- They are all equipped with handy, efficient pipe benders.
- They all have pipe rests built into them.
- Yoke and chain vise stands have handy tool trays.
- Yoke and chain post vises are equipped with oil can holders.
- And in 2" and 2½" capacities all **RIGID** Vises are equipped with No-Mar jaws for nickel pipe.
- These features make it well worth your while to ask for **RIGID**s when you buy vises.

See your Jobber

The Ridge Tool Co., Elyria, Ohio, U.S.A.

RIGID

Pipe Wrenches

Cutters

Threaders

Vises

characteristic of practically all general-purpose grinder installations. The lamps are connected to the motor switch, so that they are on only while the grinder is in actual use.

Extended wheel housings provide plenty of room around the wheels for handling odd-shaped work. Tool supports are completely machined, to insure accurate setting. The aloxite wheels supplied as standard are balanced to within 1/10 ounce-inch, to insure absolutely true, vibrationless running and accurate work.

THE NEW FEDERAL COMPARATOR

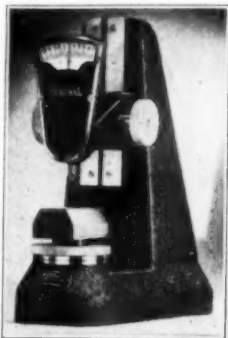
Realizing that modern mechanical requirements were calling for finer and finer tolerances, the Federal Products Corporation of Providence, Rhode Island, has designed and put on the market their Model 110 Clear Vision Dial Comparator, which measures a half of 1/10,000 of an inch very clearly.

This Comparator uses a Model 95 Clear Vision Indicator. The dial is graduated to one half of 1/10,000 and each one of these graduations measures .1175 between lines, or .1235 for each 1/10,000 graduation.

The Comparator, itself, is extremely rigid, as would be necessary in a precision instrument of this character. The indicator is raised and lowered by means of the right hand knob shown in the illustration. The indicator is clamped in position by means of the left hand knob, and with a minimum amount of change in position.

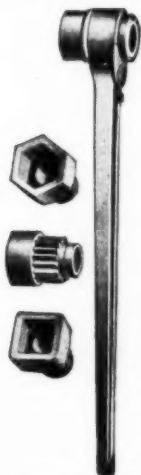
The lower anvil is raised and lowered by means of a large diameter ring, which bears upon ball bearings. The thread, itself, is a 24 pitch thread, which gives a micrometer adjustment to the anvil.

Although the anvil illustrated is standard, other special types can be furnished by the company. The complete instrument, because of its compact and streamlined design, is extremely accurate and practical for determining extremely fine sizes.



(Continued on Page 20)

POWER and ACTION with COMPLETE SAFETY



When You Use The NEW SAFETY-STEEL **LOWELL WRENCH**

TRY A LOWELL WRENCH on your hardest job—whether it's steel construction, pipe coupling, timber bolting, cable clamps, staybolt caps, grease plugs, countersunk plugs, tunnel liner plates, culvert connections, wood tank or silo bands, railroad track bolting—anything that will give you a chance to see how it can take the toughest kind of punishment. The LOWELL will stand up under the greatest strains for it is made of an electrically treated metal of unusual strength. Has fully enclosed ratchet and parts with absolutely crushing action on hardened steel pawls.

**Will NOT Break — Successfully Resists a
Straight Pull of MORE THAN A TON!**

Actual tests have proved that a two-foot LOWELL Wrench will withstand a straight pull of from 2200 to 2400 pounds (equal to the combined pulling strength of ten husky men) without bending or breaking. You can depend on a LOWELL—it may bend to warn you, but it **WILL NOT BREAK!**

Write for Complete Information including Prices

LOWELL WRENCH CO.
WORCESTER, MASSACHUSETTS, U. S. A.

Pump It Home SAFELY with a LOWELL

NEW 12-IN. BALDOR BENCH AND PEDESTAL GRINDER

The Baldor Electric Co., 4351-63 Duncan Ave., St. Louis, Mo., announce the addition of a 12" bench and pedestal grinder to their present grinder line.

The features of this new product, according to the manufacturer, are: heavy duty motor, either 2 h.p. or 3 h.p. according to preference; exhaust type hinged guards; adjustable tool rest; which can be tilted for angle grinding; heavy wide-base pedestal. Standard equipment includes waterpot, tool trays and starter.

The manufacturer will send a free descriptive bulletin to those writing for it.



NEW PHILLIPS RECESSED HEAD SELF-CENTERING SCREWS AND BOLTS

The American Screw Company, of Providence, R. I., is introducing a line of screws and bolts with a newly designed, recessed head which marks the first important improvement in screws since the introduction of the gimlet pointed wood screw by the same company eighty-five years ago.

In the Phillips head a tapered recess which exactly fits a tapered driver takes the place of the slot in the ordinary screw. Placed on the market after thorough tests under actual working conditions in a wide variety of industries, Phillips screws have shown a considerable increase in efficiency of the screw driving job. Users find that they provide faster driving, better holding power, better appearance, reduced spoilage, fewer accidents, and many other advantages.

The Phillips screw holds on the point of the driver and may be moved into position for driving with one hand, a feature of particular importance when driving in "hard-to-

(Continued on Page 22)

... For Stacking and Storage of Boxes and Pans USE STACKRACKS



Write for circular.

*For prices specify
outside dimensions of
boxes to be stacked.*

*State approximate
weight of contents.*

Patents Pending

Saves Space, Time, and Labor

Store boxes and pans in an orderly manner—one on top of the other. Each stored unit is easily and quickly accessible as the top one...each stored unit can be moved, changed or replaced without disturbing any other.

The STACKRACK is ideal for use on assembly floor, in machine shop, under work bench, and for stockroom control. In fact, STACKRACKS can be used to advantage wherever you have a storage and stacking problem. STACKRACKS are made in single units. They are constructed of angle and formed steel parts, welded together. Each rack automatically locks securely in position on the rack underneath.

**STACKBIN
CORP.**

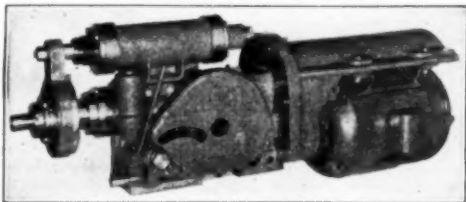


PROVIDENCE, R. I.

get-at" places. Because of the self-centering feature, there is three times as much purchase between driver and screw as there is between the ordinary driver and the slotted screw. There is no danger of the driver slipping sideways and marring the work or injuring the hands, as frequently happens when driving slotted screws. All of the effort required to hold the conventional driver in the slotted screw can be used as a turning, driving force when using Phillips screws, and they may be driven with less than half the pressure.

No pilot holes are required in driving Phillips screws unless it is necessary to remove enough wood to prevent splitting, since the snug, straight-line fit of the Phillips screw on the end of the driver provides positive control of the direction in which the screw is driven. The greater ease of driving and the greater strength of the Phillips head makes it possible to drive Phillips screws in the hardest woods with smaller pilot holes than used for slotted screws, assuring better holding power, a stronger, longer-lasting job, and frequently enables manufacturers to use fewer screws without sacrifice of strength.

NEW MILLHOLLAND DRILLING UNIT



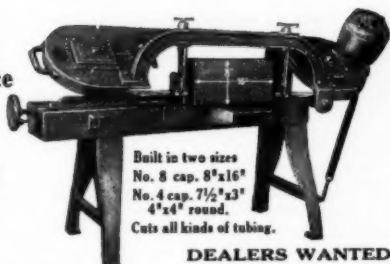
A new development in their No. 3 Automatic Drilling Unit, combining cam and hydraulic operation is announced by Millholland Sales & Machine Company, Indianapolis, Indiana.

The new unit has 3" stroke, uses from 1 to 3 H.P. motor with capacity up to $1\frac{1}{16}$ " drill in steel, and has same mounting dimensions as older models, to permit replacing older Units with the new Unit without disturbing bases, multiple heads or fixtures on present machines.

In the new unit, cam feed parts have been strengthened to increase the capacity of these members. The bronze quill bushing has been lengthened to give greater rigidity

(Continued on Page 24)

Reduce
Maintenance
and
Production
Costs with



Built in two sizes
No. 8 cap. 8"x16"
No. 4 cap. 7 1/2"x3"
4"x4" round.

Cuts all kinds of tubing.

DEALERS WANTED

WELLS Metal Cutting BAND SAW

Simple to operate. Cuts at any angle, any shape, any thickness of metal. High efficiency. Sturdy construction. Learn more about its advantages. *Send for the circular today.*

WELLS MANUFACTURING CORP.
315 Seventh Ave., THREE RIVERS, MICHIGAN

QUALITY **Strand** SERVICE

FLEXIBLE SHAFT MACHINES

Type
MP 5-1/4 H.P.



For
ROTARY FILING
GRINDING
SANDING-POLISHING
DRILLING-REAMING
NUT SETTING
SCREW DRIVING AND
MANY OTHER OPERATIONS

N. A. STRAND & CO.

MANUFACTURERS

5001-5009 No. Lincoln St., CHICAGO, ILL.

to the spindle. In addition, the spindle quill has overhead support from return cylinder piston rod, which is piloted in the front and back bushings of the return cylinder.

The return cylinder is now arranged to use low (75 lbs.) hydraulic pressure. For this purpose there is provided an individually motor driven low pressure pumping unit and storage tank which will maintain proper pressure on a number of Units.

Without change, the return cylinder may be used with air pressure, the air consumption being extremely low as the air is not exhausted but compressed back in the line by the forward movement of the spindle, and this acts practically like a spring. For this purpose the cylinder is brass lined, with piston rod; and all cup retaining parts are of non-corrosive material to eliminate deterioration due to water in the air line. An improved dash pot check in the cylinder eliminates any shock or jar on return stroke.

The motor mounting takes any make of motor, foot type, with standard NEMA dimensions in frame sizes 224 and 225. Two types of mountings are available, one for 1-4 reduction from motor speed and the other down to 1-16 through back gearings. Unit has high speed capacity up to 3000 RPM.

Each unit is equipped with automatic non-repeating clutch with positive knockout. A number of units can be started from one control valve, but feed disengagement is automatic on each individual Unit after it has completed its cycle of quick approach, work operation and return.

Cam operation permits cycle operations up to 60 per minute or down to 1 minute or more per cycle. In practically all cases, cams have an efficiency of 80% for cutting metal, only 20% being necessary for quick approach and return. Cams used are hardened steel plate cams and are inexpensive to replace. The contour can be made to suit the job. Different leads can be cut on one cam, so that combination drilling and spotfacing or bottoming operations can be handled in one operation. Cams can be made to withdraw spindle so that deep holes can be drilled in several steps. Also cams can be made for tapping operations or for combination boring and tapping operations.

Cams and feed gears are readily changed on the new No. 3 unit, being in pick-off position protected by cast iron covers on either side of the body. Spindle speeds can be changed by changing gear on motor shaft and spindle gear. This is accomplished by removing four bolts and separating motor mounting with motor in place, from the

(Continued on Page 26)

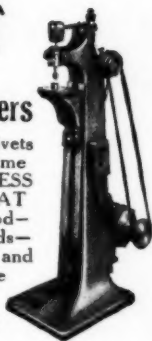


GRANT

Riveters--Pioneers

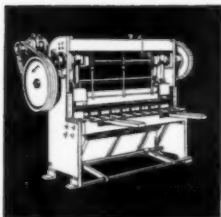
in their line—Head rivets from smallest to $\frac{5}{8}$ " diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

Write for literature—and don't forget to send samples.



The Grant Mfg. & Machine Co.
C. E. Station, Bridgeport, Conn.

Chicago Steel Power Shears



Lengths 3 to 16 ft.

Capacities, 14 ga. to 1" Plate.

Unbreakable Steel
Construction.

All Modern Features for Fast
and Accurate Shearing.

Send For Catalog

DREIS & KRUMP MFG. CO.

*Pioneer Manufacturers of Steel Plate Constructed
Sheet Metal Working Machinery*

7440 Loomis Blvd.,

CHICAGO, ILL.

unit. Motors of different make, speed and horse power may be substituted on the motor mounting.

The unit can be mounted either horizontally or vertically or at any angle. Flanged quill for mounting multiple heads is standard equipment on the new No. 3 unit, but No. 2 or No. 3 morse taper can be supplied for single spindle work.

Other Millholland Automatic Drilling Units include, No. 2 size with 2½" stroke using ⅓ to 1 H.P. motors; No. 4 size with 5" stroke using 1 to 3 H.P. motors; No. 5 size with 6" stroke using 3 to 7½ H.P. motors; No. 6 size with 8" stroke using up to 10 H.P. motors.

NEW A-C MAGNETIC CONTACTOR FOR BUILT-IN USE

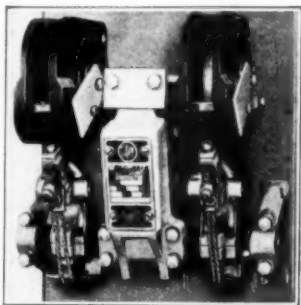
The Electric Controller & Mfg. Co., Cleveland, Ohio, announce a new AC magnetic contactor of 100, 150 and 300 ampere capacity.

Known as the EC & M Type LTZ LINE-ARC Contactors, these units are built of light weight, quick moving aluminum alloy construction providing an entirely new standard of high speed operation.

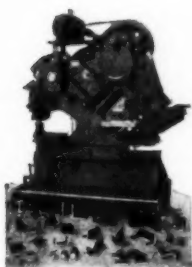
They are made with a full floating, resiliently mounted armature which has eliminated the annoying hum and chatter caused by uneven meeting of pole faces and has also cushioned the slam on closing. In addition, this flexible union between core faces gives an added impetus in opening the contactor, causing it to drop out cleanly and quickly.

Bearings used in these contactors are of the Oilite, self-lubricating type and are of self-aligning, spherical design making it extremely easy where required to remount these contactors as part of switchboards and similar panels.

Contacts for these new contactors are made by a new and special process which has produced a metal having



(Continued on Page 28)



PELS

Combination Punch, Plate Shear, Angle, Bar and Tee Cutter

With Built-In Notcher and Coper

A complete fabricating shop in one small unit

Indispensable for structural, architectural, ornamental iron work and general maintenance and repair work of industrial plants.

CUTS Plates of any length and width; Flats; Rounds and Squares; Angles and Tees square and on mitre; Perfect cuts obtained.

PUNCHES Plates and Structural Shapes in webs and flanges; Full Floating Punch Head.

COPES and **NOTCHES** angles, etc.

Guaranteed Unbreakable Steel Plate Frame

Built in Eight Sizes

HENRY PELS & CO., Inc. 90 West Street,
New York, N.Y.

WHITNEY TOOLS



No. 455 COMPLETE ANGLE-IRON UNIT

Capacity
2"x2"x1/4"
angle iron
Weight 225
pounds.

SPEED

Notches and
Bends 2"x
2"x1/4" Angle
Iron in One
Minute Flat.



BALL BEARING PUNCH No. 20

Capacity, 1/2" thru 1 1/2" iron.
Weight, 20 lbs.

Will Also Drive Rivets.

Write for Catalog and Price List on Entire Line

WHITNEY METAL TOOL COMPANY
95 FORBES ST., **ROCKFORD, ILL.**

much greater resistance to wear, and providing much longer contact life. In addition, contact life has been increased materially over any existing standard of comparison by scientific control of the arc by the LINE-ARC principle. With this method, the arc is immediately removed from the contacts as soon as they start to separate and is transferred to the arcing plate and blowout guard where it is moved at high speed along these parts.

These contactors are built in single, double and triple pole style and are arranged for terminal connections either at the front or rear of the contactor base.

"BLISS" AUTOMATIC HIGH PRODUCTION PRESS

A rather neat and efficient self-contained high speed automatic press is illustrated herewith. The press proper is one of the smallest power machines built by the E. W. Bliss Company, Toledo, Ohio. For the sake of accessibility and the saving of the floor space, the machine is mounted on a pedestal of convenient height as shown. The press is a complete self-contained unit in itself being direct geared to a $\frac{1}{2}$ horse power motor which drives the flywheel at a speed to give 700 strokes per minute. All gearing is carefully protected by metal guards to afford safety to the operator.



The automatic feature is obtained by a special type of roll feed mounted on the left end of the bolster, which has been especially designed to receive it. The feeding mechanism of the rolls is actuated by a bellcrank on the flywheel end of the shaft. The bellcrank has a screw adjustment which give a variation in the amount of feed from 0 to 1 inch.

A substantial hand wheel for positive adjustment of the tandem roller mechanism is provided. The feed rolls are not shown. They are attached to the four studs on the side of the feed.

(Continued on Page 30)

Angle Steel Stool Company

Plainwell, Michigan

Manufacturers of Standard Office and Factory Steel Equipment

Special Equipment built to your specifications

A Complete Line of Steel Work Benches, Bench Legs and Bench Drawers

Are you planning on additional work bench space? If so, write us for information on our complete line of Steel Bench Legs and Bench Drawers. They are all ready for you to attach the plank tops and shelves for good sturdy benches. We have many sizes and patterns.



No. 9-26 Bench Leg

Representatives in all principal cities

Chicago, 'phone Randolph 1570 Cleveland, 'phone Yellowstone 3426
New York City, 'phone Barclay 7-5559 or 7-5560

Standardize on MARVEL HOLE SAWS

Standardize on MARVEL Hole Saws and you will be ready for any job. Their greater strength, Genuine High-Speed Steel Edge and *unbreakable* body, adapts them for cutting large holes everywhere—for light or deep drilling, even for production use on drill presses. Sizes to 4 1/2 inches, interchangeable arbors for standard chucks—they can always be counted on to give large, true holes at low cost.



Write for Circular

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

341 N. Francisco Ave., CHICAGO, U. S. A.

SOUTH BEND 9-IN "WORKSHOP" LATHE

A new catalog, illustrated herewith, has just been issued by the South Bend Lathe Works, South Bend, Indiana. It contains many valuable instructions as to methods of performing various jobs, in addition to fully describing the 1936 model of their 9" "Workshop" Precision Lathe.

This lathe features ten new improvements, among which are: a simplified twin gear reverse for cutting right and left hand screw threads of 4 to 40 per inch, a countershaft of either the double friction type or the horizontal type with either the plain or adjustable belt tension, a newly improved back-gear headstock with larger spindle bearings and a new ball bearing thrust collar on the spindle, a new and heavier designed saddle,

and a simplified gearing for threads and speeds. The lathe has a strong, rigid bed of a one piece casting with 50% steel and 50% nickel iron composition, and comes in four different lengths of 3-ft., 3½-ft., 4-ft., and 4½-ft., with distances between centers of 17", 23", 29" and 35" respectively.

Sixty-four major tests to measure accuracy to within .001" are made on each lathe, gauging alignment of the headstock spindle with the bed, the alignment of tailstock spindle with the headstock spindle, etc.

There are 8 different models, both in bench and floor leg style for convenience in location to individual needs. Metals of all kinds can be machined, as: cast iron, steel, steel forgings, wrought iron, brass, bronze, copper, babbitt, aluminum, and the various alloy steels and metals.



(Continued on Page 32)



BURKE **Milling Machine**

This milling machine is designed to speed up and economize the milling of work too small to be profitably handled on larger millers.

It is one of a line of five millers that are fast, accurate and dependable.

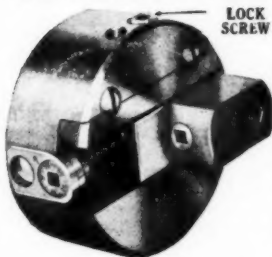
Either ball or plain bearing spindles

No. 3 Hand Feed Milling Machine

Write for Circulars

The Burke Machine Tool Co., 297 E. 16th St.,
Conneaut, Ohio

FLYNN MICROMETER OFFSET BORING HEADS



No. 30

This dovetail designed head is particularly useful where a large offset is required. Body is solid steel, dovetailed hardened tool holder has $2\frac{1}{2}$ " offset. Tension gib and locking device takes strain of micrometer screw. Dial graduated in thousandths, 50 thousandths to a turn, insuring accurate adjustment in boring. Bar capacity is $\frac{3}{4}$ -. $\frac{3}{4}$.

Write for information on other styles and sizes

FLYNN MANUFACTURING CO.
435 Bates St., **Detroit, Mich.**

Six spindle speeds ranging from 39 to 630 R.P.M. are available on the standard headstock, three obtained on the open belt and three in back gear, the latter with a ratio of 5 to 1, thus permitting a great amount of power to take the heaviest of cuts. Optional is the four-step cone headstock for V-belt drive providing 8 spindle speeds, the two-step double V-belt drive cone providing four spindle speeds, and the single step triple V-Belt drive furnishing two spindle speeds, all three types designed for extra power. all three types designed for extra power.

A complete set of attachments for handling a wide variety of work can be fitted to the 9-inch Workshop Lathe, so that over 75% of the jobs in the average shop can be performed, from the fine, accurate detail work, to the large, heavy cutting tasks.

This lathe is particularly adaptable for use in groups on production of small duplicate parts in the manufacturing plant, for the tool room, machine shop, auto service shop, laboratory, school shop, repair shop, home workshop, and for modern shops of all kinds engaged in light, accurate machine work.

Any reader interested in securing a free copy of the catalog may write the Technical Service Department, South Bend Lathe Works, South Bend, Indiana, mentioning this publication.

NEW WARNER & SWASEY 4-A UNIVERSAL TURRET LATHE

A new 4-A Universal Turret Lathe is announced by the Warner & Swasey Co., Cleveland, Ohio. The machine is offered in 8" and 9" spindle capacities and 28 $\frac{1}{4}$ " swing. The spindle is mounted on Timken precision bearings at the spindle nose end, and on precision straight roller bearings at the rear. All shafts of the head are mounted one above the other to the rear of the spindle, thus placing the gear train entirely to the rear. This construction promotes rigidity and permits the larger spindle.

Increased depth of bed section reaches down almost to the chip pan. Passage for chips is provided in arched holes under the rear way of the bed. A new cross slide and square turret offer new rigidity featured by a square lock gib. This is used for the first time in combination with the

(Continued on Page 34)



For

**Machinists and Toolmakers
Diemakers and Modelmakers**

**General machine shop and
tool room use on tools, dies,
jig, fixtures and machined
parts.**

This "LAYOUT FLUID" has
a considerable advantage over
the old copper sulphate method,
because the scribed lines have a

pronounced contrast against the dark background—relieving eyestrain
and allowing the workman to work accurately and easily to the desired
layout. This compound may also be used to an advantage in layout work
on brass, aluminum, stainless steel, tin, copper, etc.

With the use of the die blue layout fluid you do not have to polish the
surface. Simply wipe surface fairly clean and brush on. **DRIES IN-
STANTLY.** This modern method of layout is a great time and money saver.

Four oz. Combination Brush-in-Can (for shop use) - - - 50c
One quart Sealed Handy Can (for stock room) - - - \$2.00

Dayton Rogers Manufacturing Co., 1845 E. Franklin Ave.,
Minneapolis, Minn.

RENU TOOL COMPANY

GRINDING SPECIALISTS

**THE ONLY TOOL SALVAGE FIRM
AUTHORIZED BY THE FACTORY
TO SALVAGE**

WELDON END MILLS

RENU INTO NEW

**YOUR OLD WORN OUT MILLING
CUTTERS, SAWS, END MILLS
DRILLS AND REAMERS**

6517 BRUSH ST., DETROIT, MICH.

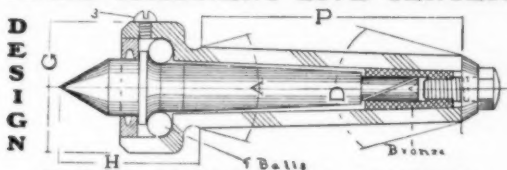
conventional dovetail on the opposite side of the cross slide. This construction offers new capacity for absorbing the strains in overhanging tools; it supports even the heaviest cuts taken by carbide cutters with noticeable absence of vibration. The ideal means of taking such loads is here provided with the flat surface at right angles to the load. Hard steel replaceable wear strips have also been added to the seat of the cross slide to further preserve the initial accuracy.

The square turret of this machine, made from a solid forging, has an internal circumference clamp ring which eliminates the tendency at this point for looseness due to excessive wear. The indexing clamp handle for this turret is located in front where it overcomes interference with hexagon turret tools when indexing. Operators will appreciate this construction for it permits indexing in tight positions. As optional equipment, an open type square turret can be furnished which permits multiple tooling and the holding of long shank forming tools. Conventional rockers are replaced by shims to elevate the cutting tool to the correct height. This construction is essential on carbide tools to insure the correct cutting angle after cutter regrinds.

Automatic lubrication is provided for the first time from the ways to the bed. Both hexagon turret slide and square turret carriage are equipped with an oil reservoir and a Bijur pump. A direct reading indicator is found in the head gear shift which affords increased ease of operation and enables the operator readily to pick the desired spindle speed without referring to diagrams or charts. This feature both speeds operation and removes guess work.

The independent lead screw is an important feature for threading operations. For the first time a solid lead screw is provided which is independent in its function from the feed shaft. This screw is used for threading purposes only while all feed and rapid traverse functions operate through the usual rack and pinion. By this means, the accuracy of the lead screw is preserved throughout the life of the machines. Pick-off gears are provided which are changed to provide whatever pitch of thread is to be cut. A feature of this unit is the quick return of carriage at a constant speed of five feet per minute. This is independent of spindle speed and is accomplished through a convenient lever on the apron without reversing or stopping the spindle.

RIGID RESILIENT LIVE CENTER



RIGID TRIPLE-LIFE CENTER



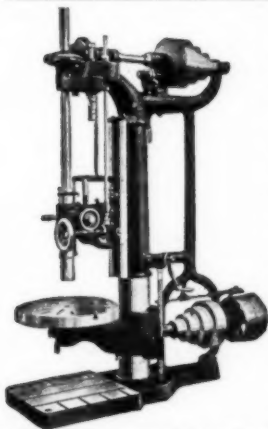
IT OFFERS:

Long Life & Short Overhang

Short Life & Long Overhang

Saves $\frac{1}{3}$ on initial tool; $\frac{2}{3}$ on subsequent inserts.

**Rigid Tool Holder Co., 12281 Turner Ave.
Detroit, Michigan**



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SIZES

Stationary Head—14'-20'-21'

Sliding Head—14'-20'-31'-36'

These machines were formerly manufactured by the Rockford Machine Tool Company of Rockford, Illinois. Thousands of these machines have been installed and are giving universal satisfaction.

Also manufacturers of the Cleereman Automatically Oiled, Anti-Friction High Speed Drilling, Boring and Tapping Machines.

Builders of drilling equipment for over twenty years.

**CLEEREMAN MACHINE
TOOL COMPANY**

Green Bay, Wisconsin

[Formerly Green Bay Barker Machine & Tool Works]

NEW EQUIPMENT TABLOIDS

**The manufacturers will be pleased to
send full information upon request**

Footo Bros. Gear & Machine Co., 5301 So. Western Blvd., Chicago, Ill., announce their new reference catalog on worm gearing. 128 pages devoted to the history and development of worm gearing, it will contain complete information and data with many curves and tables, together with other matter that cannot be readily obtained. As there will be but a limited supply of these new No. 350 catalogs, every executive interested in obtaining a copy should send on their request at once.

The Stonhard Company, 401 North Broad St., Philadelphia, Pa., have just issued a guide to successful methods of keeping floors, roofs, walls and foundations in good repair. Entitled "Over The Rough Spots," it is an attractive 24-page booklet, profusely illustrated and designed so that maintenance men, purchasing agents and plant superintendents can gather meaty information from its contents.

The Pheoll Mfg. Co., 2700 Roosevelt Road, Chicago, Ill., have ready for distribution their new 1936 catalog which contains the latest price lists, American Standard Dimensional Data, weight tables and other information on the subject of screws, nuts and bolts.

Catalog No. 35 has just been issued by the V. & O. Press Co., Hudson, N. Y., and covers their line of inclinable open back power presses and gives complete specifications with detailed illustrations.

The Chicago Gear Works, 769-73 W. Jackson Blvd., Chicago, Ill., are distributing their Catalog No. 70 which, in addition to listing their line of gears, sprockets, etc., also contains special information concerning gears.

The Geometric Tool Co., New Haven, Conn., have published a bulletin describing and illustrating the Geometric rotary and stationary, self-operating die heads with circular or tangent chasers. In addition, there is descriptive matter on the Geometric solid adjustable die heads with plain shanks and with threaded back parts, as well as the No. 12 Geometric threading machine which is a hand operated machine for general purpose work.

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DESIGNED AND CONSTRUCTED TO
GIVE SATISFACTORY PERFORM-
ANCE AND YEARS OF SERVICE—

Stock Speed Reducers
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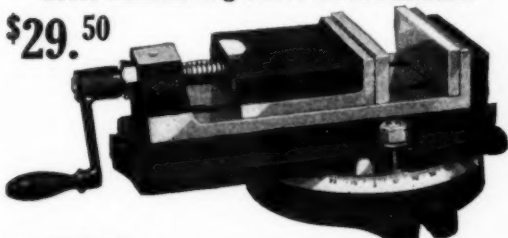
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6½" Jaws—Hardened and Ground.
2" Depth of Jaws. 4¼" Opening of Jaws.
1" Steel Screw and Bronze Nut.

● DIVIDING HEADS ● MAGNETIC CHUCKS ● MILLING MACHINE VISES

L-W CHUCK CO., TOLEDO, OHIO

New Equipment Tabloids—Continued

The Universal Boring Machine Co., Hudson, Mass., have ready for distribution a catalog covering their new 400 series of universal table type horizontal boring, drilling and milling machines. These machines are made with either a standard spindle speed range or a high speed spindle speed range.

C. B. Hunt & Son, Salem, Ohio, have published a catalog describing their line of "Quick-As-Wink" air and hydraulic valves, which are designed to give instant and smooth control. The construction principles of each valve is given, together with complete specifications for the various sizes of hand, foot, solenoid and diaphragm-operated valves. Tables of dimensions for installations are included.

The Ex-Cell-O Aircraft & Tool Corporation, Detroit, Mich., have issued a catalog describing the Ex-Cell-O line of precision products which includes thread grinding machines, boring machines, carbide tool grinders, hydraulic power units, drill jig bushings, milling cutters, broaches, counterbores, special high production multiple equipment, etc.

The Acme Machinery Co., Cleveland, Ohio, have issued a descriptive bulletin of the Acme Model 35 threading machine which can be equipped either for production work or for short runs. Specifications covering dimensions, capacity and other details are given for each of the three sizes in which this machine is built.

Catalog No. 36 has just been published by Skilsaw, Inc., 3310-20 Elston Ave., Chicago, Ill. It is handsomely printed and profusely illustrated and describes completely the 66 portable, electrically driven tools this company now manufactures.

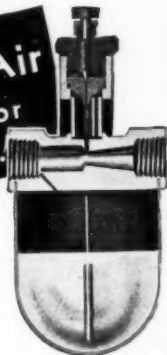
In this new catalog the company announces five new models of Skilsaw Drills. This brings the total number of drills to a total of 14 units, in sizes ranging from 1/4" capacity in steel to 7/8" capacity in steel.

Anyone interested in maintenance and production operations in factories, industrial and construction work should have a copy of this catalog which will be sent upon request.

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Oiled air stimulates tool energy—prolongs tool vitality. Feed every air tool and device a measured, adjustable amount of oil with the air that drives it, by means of a Norgren Sight Feed Automatic Air Line Lubricator. Keeps tools in condition, cuts repair costs, eliminates production delays due to "frozen" parts.

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Two styles, horizontal and vertical.



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Model No. 3524-D $\frac{3}{4}$ h.p., 3450 r.p.m., electric grinder with 6 ft. flexible shaft, tilting-swiveling castor base with tool tray. Can be furnished with interchangeable angle or straight spindles for sanding, polishing, or grinding.

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"Quality at a reasonable price"

6-inch, 10½-inch and 12-inch swing. Furnished either Right or Left hand type, for all makes of plain or universal milling machines.

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KEYWAYS CUT COMPLETE

with your
ARBOR PRESS

And Our Cutters in time required for
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Arch St., GREENFIELD, MASS.

VICTORY CHAIN HOISTS



QUALITY

is built into each
and every part.
VICTORY HOISTS
will stand, *more*
strain and wear
than required un-
der the *roughest*
conditions.

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Milling Cutters, Drills and Reamers reworked.
Tools exchanged on salvage basis.

SAVE 25% to 60%.

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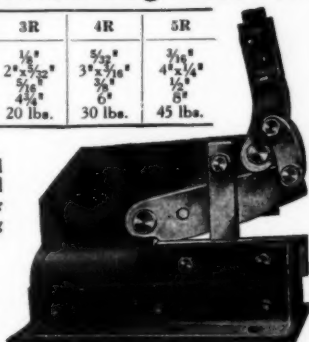
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Hand Power Forged Steel Shearing and Punching Machines

MODEL 3	SIZE	3R	4R	5R
Plates,.....		1 1/8"	5/32"	3/16"
Flats,.....		2" x 3/32"	3" x 7/16"	4" x 1/4"
Rounds and Squares,.....		5/16"	3/8"	1/2"
Blades,.....		4 1/4"	6"	8"
Weight,.....		20 lbs.	30 lbs.	45 lbs.

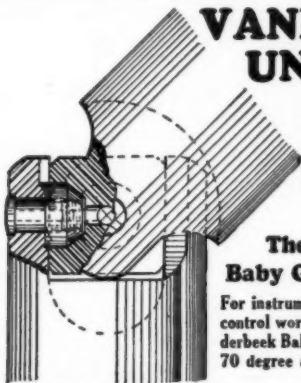
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The GIANT with hardened and ground working surfaces for heavy duty.

The Baby Giant

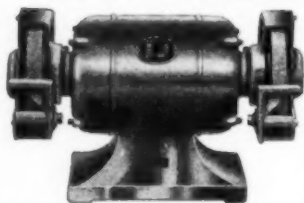
For instrument and control work. The Vanderbeek Ball Joint runs to 70 degree angle.



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Full $\frac{1}{3}$ H. P. motor
3450 R. P. M. Over-
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Induction Single
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Split Phase). Can be
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socket. Fully guar-
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Inclosed Guards, Adjustable for wear of wheel. Sub-
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New Drill Grinding Attachment

fits the Black & Decker Grinders, gives you a
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PRICE ONLY \$18. *Why not own one that
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the way they should be ground.*

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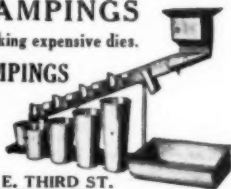
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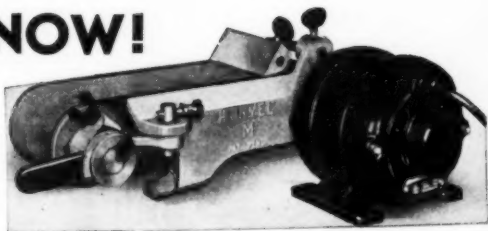
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No. 1

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Price

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Made of Malleable Iron.
 Tool steel jaws with “V” grooves and
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Length over all.....	12"	Depth of jaws.....	2"
Width.....	4½"	Jaws open.....	3½"
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We also manufacture larger vises

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With and Without Jig Attachments

Made In Three Sizes, — Jaws 6", 9" and 12" Long



Bushings inter-
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Size Up To 1 1/8"

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And Buy It

10,000 Sold,
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Fig. 1. With Jig Attachments.

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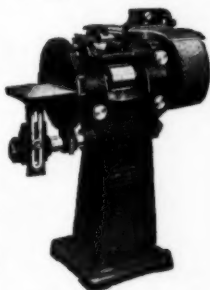


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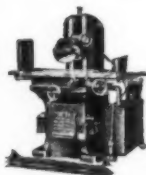


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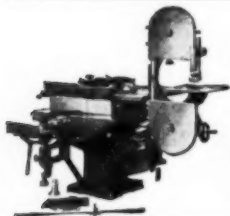


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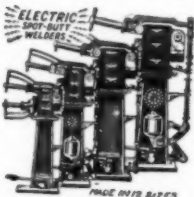
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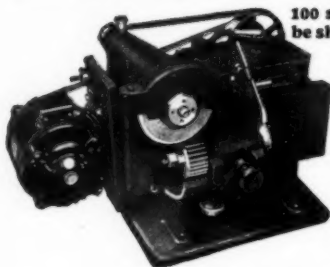
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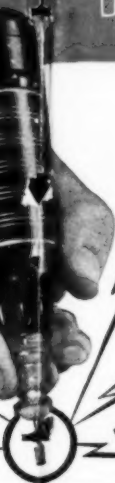
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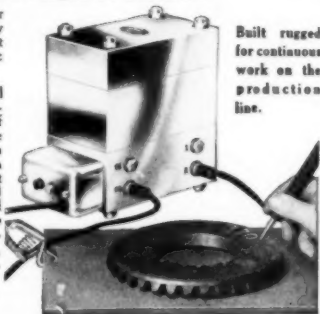
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Latest type of Hydraulic Operated Broaching Machine and Grinders.

We carry a large stock of spline and square broaches which on small orders saves you money.

Prompt service and quality has retained a large list of customers for 25 years.

The Taylor Machine Company
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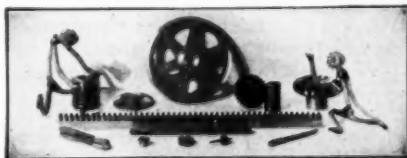
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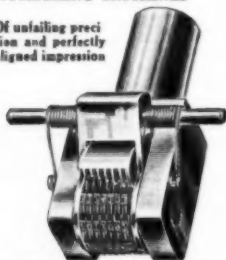


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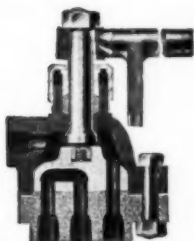
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Collman Wheel Co., 1359 Altgeld St., Chgo.
Ohio Gear Co., Cleveland, Ohio

Spot Welding Machines, Speed.

Eisler Engineering Co., Inc., Newark, N. J.
Taylor-Winfield Corp., Warren, Ohio

Sprockets

Chicago Gear Works, 769 W. Jackson Blvd.,
Chicago
Collman Wheel Co., 1359 Altgeld St., Chgo.
Massachusetts Gear & Tool Co., Woburn,
Mass.
Ohio Gear Co., Cleveland, Ohio

Stampings

Gerding Brothers, Cincinnati, Ohio

Stools and Chairs

Angle Steel Stool Co., Plainwell, Mich.

Straightening Machines

Whitney Metal Tool Co., Rockford, Ill.

Tables

Angle Steel Stool Co., Plainwell, Mich.

Tap Extractors

Walton Co., Hartford, Conn.

Tap Holders

Proconier Safety Chuck Co., 14 S. Clinton
St., Chicago

Tapping Attachments

Proconier Safety Chuck Co., 14 S. Clinton
St., Chicago, Ill.

Tapping Jigs, Universal

Heuser Mfg. Co., 1638 No. Paulina St.,
Chicago, Ill.

Tapping Machines and Attachments

Burke Machine Tool Co., Conneaut, Ohio
Cleerman Mch. Tool Co., Green Bay, Wis.
Proconier Safety Chuck Co., 14 S. Clinton
St., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Thermometers, Resistance Type

Illinois Testing Laboratories, Inc., 150 West
Austin Ave., Chicago, Ill.

Threading Machines, Automatic, Stud

Grant Mfg. & Mch. Co. Bridgeport, Conn.

Threading Tools

Armstrong Bros. Tool Co., 308 N. Francisco
Av., Chicago
Ridge Tool Co., Elyria, Ohio.

Tool Holders

Armstrong Bros. Tool Co., 308 N. Francisco
Av., Chicago
Rigid Toolholder Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, O.

Tool Salvage

Renu Tool Co., Detroit, Mich.

Tools, Abrasive

White Dental Mfg. Co., 10 E. 40th Street,
New York, N. Y.

Tools, Boring

Armstrong Bros. Tool Co., 308 N. Francisco
Av., Chicago

Tools, Lathe and Planer

Armstrong Bros. Tool Co., 308 N. Francisco
Av., Chicago

Tools, Machinists'

Armstrong Bros. Tool Co., 308 N. Francisco
Av., Chicago

Tube Flanging Machines

Grant Mfg. & Mch. Co., Bridgeport, Conn.

Trucks

Angle Steel Stool Co., Plainwell, Mich.

Universal Drill Jigs

Heuser Mfg. Co., 1638 No. Paulina St.,
Chicago, Ill.

Universal Joints

American Tool Works, Inc., Hartford, Conn.
Chicago Gear Works, 769 W. Jackson Blvd.,
Chicago

Classified Finding Index

Used and Rebuilt Machinery

Alamo Engine Co., Hillsdale, Mich.
 American Machinery Co., Cleveland, Ohio
 Atlas Equipment Co., 114 S. Clinton, Chgo.
 Belyea Co., Inc., 159 W. 19th St., New York, N. Y.
 Blower Mfg. & Mch. Co., Springfield, Ill.
 Brotherhood & Son, Percy M., 114 Liberty St., New York, N. Y.
 Brown Machinery Co., St. Louis, Mo.
 Brownell Machinery Co., Providence, R. I.
 Cincinnati Mch. & Supply Co., Cincinnati, O.
 Clinton Mch. Co., 32 S. Clinton St., Chgo.
 Consolidated Used Machinery Mart, 440 N. Oakley Blvd., Chicago, Ill.
 Craig, Jr., Thomas H. Bridgeport, Conn.
 Davis Machinery Co., Toledo, Ohio.
 Denny, W. I., 618 W. Lake St., Chicago
 Detroit Manufacturers Supply Co., Detroit
 Eastern Machinery Co., Cincinnati, O.
 Ermerman, Louis E. & Co., 1761 Elston Ave., Chicago, Ill.
 Easley Machinery Co., E. L., 835 Keen St., Chicago, Ill.
 George, James W., Detroit, Mich.
 Goldman, Harvey H., Detroit, Mich.
 Herben Machinery Equipment Co., 50 S. Clinton St., Chicago, Ill.
 Hill, Clarke & Co., 845 W. Washington Blvd., Chicago, Ill.
 Ideal Machinery Co., Plainwell, Conn.
 Indianapolis Machinery & Supply Company, Indianapolis, Ind.
 International Machinery Co., Detroit, Mich.
 Interstate Mch. Co., 139 S. Clinton, Chgo.
 Iroquois Machinery Co., Buffalo, N. Y.
 Johnson & Sons Machinery Co., Wm. C., St. Louis, Mo.
 Jones Machine Tool Co., Cincinnati, Ohio
 Kennard-Rafkin Mchry. Corp., 160 Liberty St., New York, N. Y.
 Kleisher Mchry. Co., E. L., St. Louis, Mo.
 Long Machinery Corporation, Boston, Mass.
 Lucas & Son, J. L., Bridgeport, Conn.
 McDonald Machinery Co., St. Louis
 McGill Machine Co., Binghamton, N. Y.
 Marr-Galbreath Mchry. Co., Pittsburgh, Pa.
 Meyer Blower Co., Wm. W., 1045 West Washington Blvd., Chicago, Ill.
 Midwest Equipment Co., 628 W. Lake St., Chicago, Ill.
 Miles Machinery Co., Saginaw, W. S., Mich.
 Motter Machinery Co., Chas. L., 120-124 S. Clinton St., Chicago
 Morey & Co., 45 Mill St., Astoria, Long Island, N. Y.
 Noble Machinery Co., 217 Centre St., New York, N. Y.
 Norton-Broadway Machinery Co., Cincinnati, Ohio
 O'Brien Machinery Co., Philadelphia
 Ohio Gear Co., The, Cleveland, O.
 Ohio Mchry. & Supply Co., Cincinnati, Ohio
 Ott Machinery Sales Co., Detroit, Mich.
 Osborne & Sexton Mchry. Co., Columbus, O.
 Pattison Supply Co., W. M., Cleveland, O.
 Reliance Machinery Sales Co., Pittsburgh, Pa.
 Reynolds & Son, Geo. T., Providence, R. I.
 Ritterbush & Co., Inc., 80 Church Street, New York City
 Riverside Machinery Depot, Detroit, Mich.
 Roiff, W. C., Cincinnati, Ohio
 Rosenkrans & Welsbecker, 2309 A Singer Bldg., New York City
 Russell Machine Co., Pittsburgh, Pa.
 Scott-Hansbach Mchry. Co., 4867 W. 20th St., Chicago
 Segal Machinery Co., 909 W. Lake St., Chicago, Ill.
 Simmons Machine Tool Corp., Albany, N. Y.
 Strong, Carlele & Hammond Co., Cleveland
 Studebaker Co., South Bend, Ind.
 Sun Machinery Co., 28 Van Buren Street, Newark, N. J.
 Surplus Stock & Mchry. Co., 1135 W. Lake St., Chicago
 Surplus Material & Mchry. Co., Detroit, Mich.
 Thompson, H. A., Fort Wayne, Ind.
 United Mchry. & Supply Co., St. Louis, Mo.
 Victor Machinery Co., 128 S. Clinton Street, Chicago, Ill.

Used and Rebuilt Machinery—Cont.

Victor Machinery Exchange, 251 Centre St., New York City
 Weber, H. J., Riverside, Ill.
 West Penn Machinery Co., Pittsburgh, Pa.
 White Mchry. Co., A. D., 108 N. Jefferson St., Chicago
 Wiener Mchry. Co., Inc., 237 Centre St., New York City
 Wigglesworth Mchry. Co., Cambridge, Mass.
 Wehnich Machinery Sales, 21st & Marshall Blvd., Chicago, Ill.
 Zevo, Alex, Rm. 2107, Woolworth Bldg., New York City

Valves, Foot, Lever & Solenoid

Nicholson & Co., W. H., Wilkes-Barre, Pa.

Vises, Drilling Machine

Armstrong-Hum Mfg. Co., 341 N. Francisco Av., Chicago
 Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago
 Graham Manufacturing Co., Providence, R. I.
 Heuser Mfg. Co., 1838 No. Paulina St., Chicago, Ill.
 I-W Chuck Co., Toledo, Ohio
 Martin Tool & Die Works, J. E., Springfield, O.
 Sampson Tool Co., Inc., 101 Walker St., New York, N. Y.
 Sheldon Machine Co., 3255 Cottage Grove Ave., Chicago, Ill.

Vises, Drill

Johnson Tool Co., East Providence, R. I.

Vises, Machinists'

L-W Chuck Co., Toledo, Ohio
 Sheldon Machine Co., 3255 Cottage Grove Ave., Chicago, Ill.
 Western Tool & Mfg. Co., Springfield, O.

Vises, Milling Machine

Graham Manufacturing Co., Providence, R. I.
 Hartford Special Mchry. Co., Hartford, Conn.
 L-W Chuck Co., Toledo, Ohio
 Sheldon Machine Co., 3255 Cottage Grove Ave., Chicago, Ill.

Vises, Shaper

Graham Manufacturing Co., Providence, R. I.
 L-W Chuck Co., Toledo, Ohio

Waste Cans

Angie Steel Stool Co., Plainwell, Mich.

Welding Machines, Electric Spot

Kisler Engineering Co., Inc., Newark, N. J.

Welding Machines, Resistance

Kisler Engineering Co., Inc., Newark, N. J.

Wheel Dressing Diamonds

Menden Cutting Factories, Inc., 505 Fifth Ave., New York City

Wheel Fullers

Armstrong-Bray & Co., 315 N. Sheldon St., Chicago, Ill.

Wheels, Grinding

Chicago Wheel & Mfg. Co., M.C. Tool Div., 116 S. Aberdeen St., Chicago, Ill.

Woodworking Machinery

Tannenwits Works, Grand Rapids, Mich.

Wrenches, Ratchet

Lowell Wrench Co., Worcester, Mass.

Wrenches, Socket

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Used and Rebuilt Machinery Section

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of 60 cents a line across the page, each issue, plus \$3.00 for name and address. Minimum charge, \$6.00. No display permitted.

Write directly to those offering the machines for sale, for prices and full descriptions. If what you seek is not advertised, use the blank enclosed to make known your wants in either new or used machinery and the publisher will pass them along to the advertisers.

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W. C. Roll,	6035 Cary Ave., Cincinnati, Ohio
Drill, U. S. Electric, 4-110 volts, two speeds.....	\$27.50
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Motor, Wesche 5 h. p., 3 60-220-1200 r. p. m.....	45.00
Motor, Lincoln 10 h. p., 3-60-220-1750 r. p. m.....	75.00
Motor, Century, 1 phase, 60 cycle, A. C., 1550 r. p. m.....	27.50

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Air comp., 6x6 Ingersoll-Rand, \$ 195.	Miller, No. 6 Transit..... \$ 295.
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Lathe, 22"x8' taper att..... 250.	Radial drill, 7' Bement..... 395.
Lathe, 36"x18' L. & Ship. m. d. 1895.	Shaper, 20" S. & Mills..... 195.
Miller, No. 3H LeBlond..... 500.	Slotter, 13" Bement..... 295.

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Dieing mche., 50-ton Henry & W.	Miller, No. 4 Cincinnati vertical.
Grinder, No. 2 1/2 Bath universal.	Miller, No. 3 B. & S. plain, cone.
Grinder, 20"x120" Norton plain.	Planer, 24"x24"x6' Whitcomb.
Lathe, 60"x30' Pond.	Screw machine, No. 4 B. & S. w. f.

FOR SALE BY

Alex Zeeve,	Room 2107, Woolworth Bldg., New York City
Bor. mill. & drill, mch., Clev. horiz.	Power hammers, 250 lb. Little Giant;
Comb. punch & s., No. 53 H. & W.	200 & 150 lb. Dupont.
Comb. punch & s., No. 53 H. & W.	Radial drill, 3 1/2" Morris s. p. d.
Lathe, 26"x12' Bridg., h. d., q. c. g. t. a.	Shaper, 28" G. & E., h. d., cone dr.
Millers, No. 3 1/2 Fox.	Wheel press, N-B-P 100 tons, horiz.

Also other tools not listed above.

FOR SALE BY

Wigglesworth Machinery Company

199 Bent Street,	Cambridge, Mass.
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Boring mill, 24" Bullard, New Era.	Miller, 5B heavy B. & S., rap. trav.
Boring mill, 42" Bullard New Era.	Miller, No. 3 Cincinnati universal.
Boring mill, Cleveland 2 1/2" bar.	Miller, No. 3 Cincinnati vertical.
Grinder, No. 2 Cincinnati, centerless.	Nibbler, Gray 3/16"-34" throat.
Hammer, No. 6B Nazel.	Planer, 42"x42"x22' Pond 4 h., rev. md.

Send for Complete Stock List.

USED AND REBUILT MACHINERY

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Boring mills, Barrett 5" bar horiz.
Boring mill, Niles 36" vert., 2 hds.
Drills, Cin-Bickford 3' & 3 1/2' radials.
Gear cutter, G. & E. 36" s. p. d.
Gear cutter, G. & E. 60" m. d.
Gear hobber, G. & E. 24".
Grinders, B. & S. No. 2 surf. & univ
Grinder, Norton 10x120" plain.
Grinder, B. & S. Nos. 10 & 16 plain.
Keyseaters, M. & M. Nos. 1 & 2.
Lathes, Reed-Prentice 16"x6", q. c. g.,
grd. hd.; Hendey 14"x6", q. c. g.;
50 others in stock.
Milling machines, B. & S. No. 5, vert.
Milling mchs., B. & S. No. 1 1/2 Cinc.
No. 1 1/2, Hendey No. 1-B, Kemp.
No. 3; Ohio No. 29; vertical slott.

1535 N. Broadway, St. Louis, Mo.

attach., all universal; Kemp. No. 1,
LeBlond No. 3-H; Brown & S.
No. 3-B, s. p. d., Brown & Sharpe
No. 3, all plain, Cincinnati 12"
Mfg.; Milw. No. 3-B s. p. d., d. o.
Cincinnati No. 3-S pl., s. p. d.
Punch press, d. c. grd., 79" between
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Toledo No. 56, s. s. grd., 14" str.;
L. & J. No. 5, o. b. i.
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12", 16", 18", 20", 24" and 26"; S. &
M. 28", s. p. d.; Cin. 24" m. d. g. b.;
American 24" m. d., gear box.
Turret lathes, W. & S. No. 2A univ.
Turret lathes, Libby 18" geared
head universal, Gisholt univ.

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D. C. MOTORS

Adj. Speed—230 Volt

H. P.	TYPE	SPEED
1-1500	West.	470/600
1-300	Cr. Wh.	200/400
1-250	El. Dy.	300/900
3-120	G. E.	300/750
1-100	West.	365/600
3-80	Diehl	500/1100
1-60	G. E.	400/1050
2-56	West.	225/600
1-40	West.	300/900
1-35	West.	500/1500
1-35	Cr. Wh.	800/1600
1-25	West.	400/1200
3-25	West.	650/2200
1-20	West.	650/1300
2-20	West.	375/1500
20-20	G. E.	650/1950
1-20	West.	500/1500
1-20	G. E.	500/1500
2-15	El. Dy.	300/900
1-15	West.	600/1200
6-15	West.	400/1600
1-10/14	El. Dy.	300/1200
30-10	West.	500/1500
20-10	G. E.	600/1800

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1000 k. w. G. E. Type MPC, 275 v.
D. C. Gen., conn. to 1440 h. p. G.
E. at 4600/2300 volts, 514 r. p. m.,
3 ph., 60 cy.
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r. p. m.
175 k. w. G. E., D. C. Gen. 275 v.
comp'd inter pole, dir. conn. to 290
h. p. G. E. Synch. Motor, 2300/440
v., 3 ph., 60 cy., 720 r. p. m.

A. C. MOTORS

Synch. Type

H. P.	TYPE	VOLTS	SPEED
1-2850	G. E.	2300/4150	450
1-675	Al. Ch.	2200/550	900
1-600	G. E.	2200/550	257
1-260	Al. Ch.	2200/440	720
1-125	West.	2300	900
1-50	G. E.	440/220	1200
1-35	G. E.	440/220	1200

SLIP RING

1-1200	West.	2200	360
1-600	G. E.	2300/550	257
1-600	G. E.	2300/440	705
1-450/360	West.	2200	875/700
1-400	West.	2300	514
1-400	West.	550	505
1-300	G. E.	550	575
1-250	F. Morse	2200	1200
1-250	West.	2300/440	700
2-200	West.	220/440	900
1-200	G. E.	220/440	900
1-150	G. E.	440	1750

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1-300	Cr. Wh.	2300/220	580
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1-150	West.	220/440	720
1-150	West.	220/440	580

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Bor. mills, 24" & 42" Bullard New Era.
Bor. mill, 36" Bullard, side hd. s.p.d.
Boring mill, 42" 2 heads Bullard.
Boring mill, 48" Gisholt r.p.t., 2 hds.
Bor. mill, 7'-10' Betts, 2 heads, b. d.
Boring mill, 24" bar Cleveland, s.p.d.
Bor. mill, hor. 4" bar Sellers, fl. type
Bor. mill Niles floor type, 4 & 64" bar
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Brakes, 3' & 10' x3/16" D. & K. m. d.
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Drill, sens. 4-spdl. Avev, belt drive.
Drill, 4 sp. Colburn, table 29x72.
Drill, hvy. duty, D-6 36" Colburn.
Drill, radial, 4" Prentice, t. a., b. d.
Drills, rad. 3, 4, 5 & 6" Cin.-Bick. m. d.
Drill, radial, 6" Dreses, s. p. d.
Drills, upright 10" to 38"
Drill, Baker, table 23x17", s. p. d.
Engine, gas, horiz., 20h.p. Bessemer.
Flanger, McCabe, 1" capacity, dies.
Forging mch. 14" Acme, st. fr. b. d.
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Gear cutter, spur, 36"x10" Newark.
Gear hobbors, 30" Newark, m. d.
Grinder, cyl. 10"x52" Norton, m. d.
Grinder, disc, No. 6-19-1 Besly, m. d.
Grinder, nail die, No. 101 Bridg., m. d.
Grinders, surf., rot. 8" Heald.
Grinder, sur. 14" Pratt & W., m. d.
Grinder, surf. 42" Spring., tbl. 18x84".
Grinder, surf. 84" Diamond, m. d.
Grinder, univ. No. 31 Landis, 12x40".
Hammer, Blacker, power, 35-lbs.
Hammers, No. 3-B Nazel.
Hammers, steam, 600 lb. to 6000 lbs.
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Lathe, 16"x6" LeBlond, q.c.g., d.b.g.
Lathe, 18"x8" Lodge & S. grd. hd.
Lathe, 24"x10" Reed, q. c. g., b. d.
Lathe, 24"x12" American, q.c.g., b. d.
Lathe, 24"x14" LeBlond, q. h. q. c. g.
Lathe, 24"x16" Bridgeford, g. hd. m. d.
Lathe, 30"x18" LeBl. g. h. q. c. g., m. d.
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Lathe, 36"x18" Putnam, l. c. g., t. a. b. d.
Lathe, 38"x17" Pond, t. g., b. g.
Lathe, 54"x27" Pond, g. h. p. c. g., m. d.
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Lathe, turret, 18" Libby, m. d.
Lathe, turret, 24" Steiple, 64" hole.
Lathe, spinning, 32"x6" Bliss b. d.
Miller, hand, No. 2 Pratt & W.
Miller, pl. No. 2 Kempsmith, b. d.
Millers, pl. Nos. 2A, 2B & 3B Milw.

Miller, plain, Nos. 3 & 5 Cincinnati.
Miller, pl., No. 24 B. & S. tbl. 17"x12".
Miller, pl., No. 28 Ohio, tbl. 52x114.
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Nut mche., Wat-Far. 4" cold. b. d.
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Pipe mches., 6", 8" & 12" Williams.
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Planer, 60"x60"x12" Sellers, 3 hds.,
Planer, 96"x96"x33" 4 hds. rev. m. d.
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Press, No. 3 Bliss, Stiles type.
Press, cam. No. 69N Bliss, dbl. act. inc.
Press, o. b. i. Bliss, Nos. 18, 19, 20.
Presses, Nos. 4 & 5 Nia., 2 & 24" st.
Press, No. 55 Toledo 20"x19", 24" st.
Press, No. 64 Cons., 17"x17", str. 44".
Press, No. 57 Toledo, 32"x32", str. 6".
Press dbl. crk., No. 5 Bliss, 2" str.
Press, dbl. crk. Farrell, 16x44", 6 st.
Press, screw, No. 87 Niagara.
Press, hand screw, No. 192 Tol. dbl.
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Press, forging, United 1000 ton hyd.
Press, wheel, 300 ton, motor drive.
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Punch & s., No. 12 Badger, 4" 4".
Punch & s., "C" Clev. 13 16", 4" m. d.
Punch, mult., No. 5 H. & J. 10".
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Saw, cold, No. 6 Coch.-Bly, s. p. d.
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Shaper, 16" G. & E. univ. tbl., s.p.d.
Shaper, 16" Columbia hvy. duty m. d.
Shapers, 16", 20", 24" & 36" G. & E.
Shaper, 24" Flather and P. & J.
Shaper, 32" Cincinnati, m. d.
Shaper, side head, Rockford.
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Slotter, 15" B.-M. tbl. 30" dia., m. d.
Slotter, 36" Bement, crank: 15" Dill.
Straightner, 2-A Kane & R. 20-roll.
Straightener, 14", 4" rd. Abramson.
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Welder, spot, 40 k.w. Thom. 2 pcs. 4"

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Air compressors, belted and motor.
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Boring mill, 36-44 Niles, side head motor driven.
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Grinder Hydrol hole.
Lathe, geared head 16"x7" P. & W.
Lathe, American, 20"x14".

Lathe, Walcott 26"x12".
Lathe, Lodge & Shipley, 24"x16".
Lathe, Lehman, 18"x7".
Lathe, Gisholt, 36" motor driven.
Miller, Ingersoll slab, 27"x23"x14".
Miller, No. 3 Hendey universal.
Pipe machines, 4", 8", 12" & 16".
Planer, Gray 60"x48"x10".
Press, 92C Toledo.
Presses, No. 37 Niagara.
Shapers, 16, 18, 20, 24 and 32".
Wheel presses, 48" & 60".

FOR SALE BY

Geo. M. Bernstein & Co.,

14 S. Clinton St., Chicago, Ill.

Drill, No. 2 two spindle Aveymatic.
Drills, 1 & 4 sp. Avey & Allens, h. s.
Drill, 3 1/2" Am. tri. pur. radial m. d.
Drills, 3, 4" Dreses radials, q. c. g., m. d.
Gear hob., No. 12 B.C. & 12" G. & E.
Grinder, No. 11 B. & S. self con. pl.
Grinders, Nos. 2, 3 W. & M. sur. cks.
Lathe, 14"x6" Hendey, q. c. g.
Lathe, 18"x8" Walcott q. c. g., t. a.
Lathes, No. 0 B. & O. turret collets.
Lathe, 20"x12" Brad. q. c. g., t. a.
Miller, No. 0 B. & S. pl., rack feed.
Millers, No. 1 Kemp. univ., equip.

Miller, No. 1 U. S., hand.
Miller, No. 2 Cin. pl., ver. & spir. att.
Miller, No. 3 B. & S. pl., arr. m. d.
Miller, No. 2 Rock'd, plain, s. p. d.
Miller, No. 2 Rock'd, univ., s. p. d.
Millers, No. 2 Garvin duplex.
Planer, 24"x24"x6" Gray, one head.
Planer, 30"x30"x6" Gray, one head.
Shaper, 16" Cincinnati b.g., rev. tbl.
Shaper, 16" Smith & Mills, b. g.
Shaper, 17" Averbeck, b. g., crank.
Shaper, 24" American, b. g.
Tester, No. 2 H Rockwell hardness.

FOR SALE BY

Ott Machinery Sales, Inc.,

546 Second Ave., Detroit, Mich.

Automatics, B. & S. Nos. 0, 2, 19;
Fay 14"x19"; Acme Nos. 52 & 54;
New Britain No. 452 & 652; 1 1/2",
1 1/4" & 2 1/4" Gridley, 4 spindle.
Boring mill, 5" bar Niles.
Drills, Avey, Allen, Leland-G. 4-
spindle No. 2.
Drill, radial, 4" Prentice plain.
Elec. h. s. furnace, Hoskins 12x8x16".
Engraving machines, Keller, No.
E4, E5, BG482 and BG 724.
Gear shapers, Fellows Nos. 6, 6i &
Nos. 7 & 712 high speed.
Gear generators, Gleason 8" mg. st.
bevel; Gleason 15" spiral bevel.
Grinders, Brown & S. No. 10 s. p. d.;
No. 2 B. & S. universal & surface;
Cinti. No. 3 univ.; Norton plain,
6 x 32, 10 x 50, 14 x 50, 14" x 72";
Norton No. B-91, crank pin; 16x72
Norton, crank pin.
Hammers, Billings & S. 1200 lb. bd.
drop; Chambersburg 1600 lb.; Erie
2500 lb. & 1500 lb.
Lathes, 16"x6" Flather; 16/28x10
Hamilton, cone; 16"x6" & 9" Hamil-

ton, m. d.; 18"x16" Hamilton, geared
head; 36"x15" Bridgeford g. h.; 3 1/2"
x36" Acme turret, geared head;
J. & L. 3x36" & 2"x34".
Lathes, turret, W. & S. Nos. 2, 4 & 6.
Milling mchs., Nos. 12 & 33 Kemp-
smith Mfg.; Model B Becker vert.;
No. 2 Cin'ti hi-power pl.; No. 4
LeBlond pl., cone; B. & S. No. 1 1/2
universal.
Thread mills, No. 6 Lees-B. a. m. d.;
12"x120" Pratt & Whitney.
Planers, Cincinnati 26x26x6" 1-head;
Cin'ti 48x36x8" 2-heads a. m. d.;
Cin'ti 60x60x20" 3-heads, m. d.
Press brake, 12"x16" Loy & Nawr.
Presses, Ferracute P2, 3, 4 & 5; Fer-
racute DG53 & 54; Bliss, s. s., s. c.
No. 48, 79 1/2 & 514; Toledo, No. 59 1/2;
Bliss, gap, d. c., 23 A. & J. Bliss,
d. c. Toggle No. 405B & 407A;
B & 412; Ferracute SD 504; Lucas
75-ton horizontal.
Slotters, Bement 68" geared,
Upsetters, Acme 1"; Ajax 1 1/2", 2", 3",
4" & 7".

Your Inquiries Solicited—Several Thousand Tools Available.

USED AND REBUILT MACHINERY

FOR SALE BY

The E. L. Easley Machinery Co.

Telephone Lincoln 6320

831 Rees St., Chicago

Boring bar, Rochester, 4" spindle.
Boring bar, Cleveland, 3 1/2" spindle.
Drill, radial, 5" Cincinnati-Bickford.
Lathe, 18"x8" Monarch, motor in leg.
Lathe, 30"x12" Sidney, m. d.
Lathe, 30"x16" Monarch, s. p. d.

Press, No. 3 1/2-B Bliss, toggle draw.
Press, No. 5 Consol. comb. geared.
Press, No. 22 Bliss, roll feed.
Roll, 10', 1/2" motor drive.
Shaper, 30" American, auto-oiled.
Wheel press, N. B. P., 400 ton.

FOR SALE BY

Scott-Bansbach Machinery Co., 4607 West 20th St., Chicago, Ill.

Master tool maker, Craley.....	\$ 150.
Miller, Wisconsin hand, on pedestal, 12"x4"x8 1/2".....	125.
Miller, No. 1 B. & S., plain head, power feed.....	250.
Miller, No. 2 H. B. & S., plain, cone type, with vise, c/s and arbors.....	400.
Miller, No. 3 Kempsmith, plain, cone drive.....	300.
Miller, 12" Cincinnati, mfg. type, s. p. d., vise and pump.....	150.
Miller, No. 7 Becker, Lincoln type.....	75.
Miller, Ingersoll slab, 42"x36"x9".....	400.
Motor, 20 h. p. Fairbanks, slip ring, 220, 60, 3, 360 to 720 r. p. m.....	150.
Planer, 24"x24"x6 Ohio heavy duty, 1 head.....	250.
Planer, 72"x72"x12 Gray, 4 heads.....	1,500.
Press, No. 3 1/2 Greenard with ratchet, bench type.....	45.
Press, No. 4 Greenard with ratchet, floor type, adjustable table.....	85.
Press, No. 6 Hercules, bench type, 1/2" str., 115 lbs. Fly Wheel 25 lbs.....	50.
Press, No. 20 Bliss o. b. i. 2 1/2" stroke, 28 ton, 2300 lbs.....	250.
Press, No. 21 Bliss o. b. i., 2" stroke, 37 ton, 4200 lbs.....	350.
Press, No. C4 Ferracute, o. b. i., 2" stroke, 35 ton, 3900 lb.....	300.
Press, No. 75 Cons. gap frame, comb. grd. 2" stroke 65 ton, 11000 lbs.....	700.
Press, No. 2 solid back, 1 1/2" stroke, 25 ton, 1500 lbs.....	100.
Press, No. 51 Toledo arch, 2 1/2" stroke, 56 ton, 5300 lbs.....	350.
Punch, Kneeland, 10" throat, shears 5"x1" flats.....	100.
Riveter, Grant, spinner, No. 80-A, horn table 1/2" capacity.....	75.
Riveter, No. 1 1/2 B., High speed hammer, 1/2" capacity, no ctrsft.....	60.
Riveter, No. 3 A., H. D., High speed hammer, 1/2" cap., with motor.....	200.
Riveter, No. 3 A., H. D., High speed hammer, cap. 1/2", belt driven.....	150.
Riveter, No. 4A, High speed hammer, 1/2" capacity, no ctrsft.....	200.
Riveter No. 5 A., High speed hammer, cap. 1/2", motor shelf.....	275.
Saw, Peerless, 6"x6" High Speed, hack, belt drive.....	150.
Saw, No. 2 Klem, band, for metal cutting, belt drive.....	300.
Saw, Napier, model B, band, for metal cutting, belt drive.....	300.
Scleroscope, Shore complete with stand and blocks, model C.....	125.
Shear, 30" Hertsch, 16 gauge, 12" gap, foot power.....	75.
Shear, 10" Niagara circle, No. 20 gauge, cuts 58" dia. circle.....	40.
Shear, slitting, Elgin, 26 gauge, 28" between, with cutters & fingers.....	125.
Separator, National, oil, 11 quart capacity.....	50.
Sperator, Curtis, No. 150, capacity 1 bushel.....	85.
Separator, oil, American 1 1/2 bushel.....	200.
Shapers, 13" Juengst, crank, vise and countershaft.....	100.
Shaper, 12" Gould & Eberhardt, singlecrank vise and countershaft.....	135.
Shaper, 16" Smith & Mills, back geared crank, vise and countershaft.....	350.
Shaper, 24" Walcott, H. D., back geared crank, vise and c/s.....	400.
Tapper, No. 1 Garvin Automatic, capacity 1/2" iron, 1/2" steel.....	75.
Tapper, R. & S., 1/2" capacity, horizontal, on pedestal.....	75.
Threader, 1" Acme bolt and pipe, belt drive.....	125.
Screw machine, No. 2 Foster friction head with out cross slide.....	75.
Screw machine, No. 3 Acme friction head without cross slide.....	100.
Turret lathe, 2 1/2"x10" Milholland, for chuck and bar work.....	400.
Vertical attachment for No. 2 Brown & Sharpe miller.....	100.
Welder, butt, Toledo, 8 K.W., capacity 1/2" round.....	150.
Wire straightener, Shuster, 3/16" capacity, 8 foot carriage.....	250.

USED AND REBUILT MACHINERY

FOR SALE BY

Ohio Machinery & Supply Co., 433 E. Pearl St., Cincinnati, Ohio

Boring mill, R. & K. horiz. 24" bar.
Brakes, Robinson 30" and 72".
Hack saw, Racine 6x6 cap.
Lathe, 18x6 S. Boye & E. q. c.
Miller, LeBlond No. 3 plain.

Miller, No. 14A Garvin plain.
Miller, Knight vertical.
Shear, Pettibond rotary, 31" thrt.
Shaper, Potter & Johnston 15".
Turret lathes, Acme and Fox.

Complete stock of Motors, Air compressors, Woodworking machines, etc.
Your inquiries solicited—We buy, sell or exchange.

FOR SALE BY

Herben Machinery & Equipment Co., 30 S. Clinton St., Chicago, Ill.

Air compressor, 10x10 horizontal.
Brakes, apr., 8', 10', 12, 14, 16, 18 ga.
Brakes, press, 10' 10 ga., 10' 4".
Drills, 14, 16, 26, 36", 1, 2, 3, 4 spdl.
Hammers, trip, 100 to 250 lb.
Lathes, large stock, all sizes.
Presses, Nos. 2, 3, 5: hyd. 300 ton.
Presses, all sizes.
Rolls, 3, 6, 8' and 10'.

Saws, Nos. 1, 2, 5 Marvel; 6x6, 9x9 high speed Peerless.
Screw machines, No. 00 B. & S. auto.
Screw machines, Nos. 1, 2, 3 Foster, plain and friction head.
Shapers, 7", 16", 20", 24".
Shears, pwr. sq., 10' 4", 10' 14 ga.
Welders, spot, 5 and 10 k. w.
Welders, arc, 200 and 300 amp.

FOR SALE BY

The O'Brien Machinery Co., 113 N. Third St., Philadelphia, Pa.

Boring mill, 42" Bullard vert. 2 hds.
Column facer, 14" Espen-Lucas.
Grinder, No. 55 Heald.
Grinder, No. 2 Van Norman Piston.
Grinder, 10"x52" Landis, self contained, plain.
Hammer, 800 lb. Erie, steam forging.
Hammer, 1100 lb. NBP, steam forg.
Hammer, 2000 lb. Chambersburg double frame, steam.
Keyseater, No. 2 Baker, 2" cap., belt drive.
Lathes, 18"x8" Bradford, mtr. dr.
Lathe, 24"-40"x22" McCabe, belt.

Lathe, 66"x38" Bement, motor drive.
Miller, No. 3 K. & T., univ. table 55"x15", range 34"x12"x19".
Miller, No. 4 Cincinnati universal, belt driven, table 57"x14".
Miller, No. 4 Cincinnati vertical, single pulley drive.
Pipe machines, 2, 4, 6, 8 and 12" belt and motor drive.
Punch, beam, type IG Clev., 24" bms.
Punch, No. 3 Southwark 4x4", mtr.
Radial drill, 4' Amer., mtr. on arm.
Shapers, 14, 16, 20 & 24" various makes
Shear, 8' Niagara, 15" gap, 3-16" cap.

FOR SALE BY

Reliance Machinery Sales Company

1405 Brighton Place, N. S. - - - - - Pittsburgh, Pa.

Brake, No. 205 Chicago, 10'x3/16", motor 3-60-220.
Bulldozer, No. 9 Williams-White; 24" stroke, 45" die space, weight about 70,000 lbs.
Car wheel borer, 42", hub fac. att.
Drill, 4 spdl. Colburn No. 4.
Drill & tap, No. 314 Baker, cap. 3".
Hoists, elec. 1 & 2 t., 220 v., d. c.
Lathe, 18"x8" L. & S. pat. hd., 230 v.
Lathe, 48"x20" Betts-B., a. c., m. d.
Miller, No. 2A Rockford, cone.
Miller, No. 2AS Milwaukee, double over arm, single pulley.

Miller, vert., No. 5-C Becker.
Miller and drill, No. 2 Knight.
Press, No. 24 Adriance horning, swinging table, 2750 lbs.
Press, s.s., No. 66 Cons. grd., 6" str.
Presses, Nos. 3 & 4 Toledo, o. b. i.
Press, No. 3 Bliss dbl. cr. grd. 36" bet uprights, 4" shaft.
Press Perkins dbl cr., 24" bet. hag.
Punch, L&A 1" thru 1", 24" tht.
Saw, 6" Peerless univ. shaping.
Shaper, 36" G. & E., b. g. crank.
Shear, alligator, cap. 14" sq. m. d.
Wire straightener, 3/16" Shuster, 6"

USED AND REBUILT MACHINERY

FOR SALE BY

Davis Machinery Co., St. Clair & Washington Sts., Toledo, Ohio

Air compressor, 6x6 Curtis.
Drill, 3' Bickford, radial, s. p. d., t. a.
Drill, 4 spdl. Avey, h. s., b. b.
Gear hobber, No. 3 Barber-C. (2).
Grinder, No. 2 Wilmarth & M. surf.
Keyseater, No. 2 Davis.
Lathe, 16"x8' Springfield, q. c. g., t. & c.
Lathe, 18"x8' LeBlond h. d., q. c. g.
Lathe, 18"x10' Amer. q. c. g., comp.
Mill, No. 2 Kempsmith, plain.
Mill, No. 2 Cin. hi power pl., s. p. d.

Mill, No. 4 Cin. hi. power pl. c. p.
Mill, No. 1 B. & S. vertical, c. p.
Nibbler, No. 1 Campbell, 6" throat.
Press, No. 2 Consolidated, o. b. l.
Saw, No. 2 Klemm metal cutting.
Screw machines, Nos. 4 & 6 Warner & Swasey.
Shapers, 20", 24" Steptoe crank, b. g.
Shears, 15A Niagara circle, 16 ga.
Tappers, No. 2 & 2X Garvin, vert.
Threader, 1" Landis bolt, Landis hd.

FOR SALE BY

Marr-Galbreath Machinery Co., 55 Water St., Pittsburgh, Pa.

Quality Not Reflected in These Low Prices.

Air comp., 12"x10" Chgo., a. c. mtr.
Air comp., 12"x10" Bury, belted.
Air compressor, 5"x5" Ing.-R., m. d.
Air compressor, 6"x6" Worth, vert.
Bender & straightener, No. 4 H. & J.
Blowers, Buffalo No. 4E1/60/220.
Blower, No. 3 Root, 2500 c. f. m., 12" outlet.
Blower & exhauster, No. 25 Buf., m. d.
Bolt threader 1" Geometric b. or m. d.
Boring mill, 34" Bullard vtl. thread attachment.
Boring, mill, 36"-44" N-B-P., sh. m. d.
Buffer, 5 h. p. Hisey-W., 3/60/220.
Bulldozer, No. 6 W-W., clutch, b. d.
Crusher, No. 1 Williams, hammer type, belt drive.
Crusher Allis-Chalmers, 9x9", 2-roll, belt drive.
Die sinker, No. 3 P. & W., r. t.
Driller, 5, 6-sp. Detroit, chucks.
Drill, 5, 6 spdl. L.-G., b. b., m. d.
Drill, radial, 3 1/2' Cin-Bick. t. a., m. d.
Drill, 20" Barnes, all geared.
Gear cutter, 18" Newark.
Generator, 125 k. v. a. 3/60/220/900.
Generator, 50 k. v. a. 3/60/220/1200.
Grinder, 7 1/2 h. p., U. S. dbl. end, 3/60/440.
Grinder, disc, vert 30" Gardner, m. d.
Grinder, flex. shaft motor 1 1/2 h. p. 1/60.
Grinder, T. & C. No. 1 G. & L., for motor drive.
Grinder, pl. 11 B. & S. 4x30" (cheap).
Hammer, Syntro ELEC., 1/60/110/.
Hammer, 30 lb. United, power.
Hammer, No. 2B Nazel, motor dr.
Hoist, 2-ton Sprague Elec., 3/60/220 volt motor.
Keyseater, No. 4 1/2 Burr, cap. 4 1/2"x48" for m. d.
Lathe, bench, 1"x22" Goodell-Pratt.
Lathe, 11"x4" South Bend, chuck.
Lathe, 24"x16" LeBlond, 6" raising blocks, chuck.
Lathe, 24"x14" Hendey, q. c. g., tie-b.

Lathe, 12"x8" R. P., g. h., s. p. d.
Lathe, 18"x8" L. & S., q. c. g., t. a.
Lathe, 32"x14" Diaper, cone, chuck, t. a.: for m. d.
Lathe, 32"x14" Bridgeford g. h., m. d.
Lathe, 26"x16" Bridg. g. h., t. a., s. p. d.
Lathe, 28"x20" Bridgeford, b. d.
Lathe, 20"x8" Hendey, tie bar.
Lathe, 14"x19" Fay automatic.
Miller, No. 2 Rock'd. hand, on col.
Miller, plain, No. 2A, Hendey, s. p. d.
Miller, No. 4 Ohio, table 101".
Pipe machine, 10" Cox., b. d.
Planer, Gray, 56x48x10", 4 heads.
Planer, 30"x36"x10" Liberty, 2-h. m. d.
Planer, 48"x48"x10" Gray, 3-hds., b. d.
Press, arbor, Nos. 1 & 3 Greenard;
30-ton Lourie hydraulic.
Press, Arch, No. 3A Mossberg dial feed, 12 positions.
Press, D. C. No. 133A Stoll, 3" stroke.
Press, No. 35 Nia., punch type, pl.
Press, horn, 42-h. p. Toledo.
Presses, o. b. i., 18, 19, 20 Bias.
Punch, SE., 24" tht. 1 1/2"x1", m. d.
Punch, SE., 36" tht. 1 1/2"x1", m. d.
Punch & s., 25x24 U. Buf. univ., m. d.
Riveter, Hanna Pinch Bug, 20" tht., 18" high.
Riveter, No. 5A, Hi-Speed, m. d.
Saw, No. 0 Hunter, m. d. sharpener.
Screw mchs., Nos. 1 & 4 W. & S., belt
Shaper, 20" Cincinnati, motor dr.
Shaper, 21" Smith & Mills.
Shaper, 24" Barker b. g. V-r. m. b. d.
Shear, angle, 6x6x1 1/2", H. & J. No. 2, mounted on turntable, for m. d.
Shear, throatless, Marshalltown rotary, cap. 1/2" m. d.
Steam turbines, 100 h. p. 900 rev. (2).
Transmission, No. 000 Reeves, 5:1.
Unishear, 36" throat, 14 ga., m. d.
Welders, arc, 35 amp., transformer.
Welding & cutting generator, Carbic

Partial List. Get Our Complete Stock List.

USED AND REBUILT MACHINERY

FOR SALE BY

The Ohio Gear Co., 1331 E. 179th St., Cleveland, Ohio

ELECTRIC FURNACES

Two Hoskins Electric Furnaces, type FH-273.

Inside Dimensions—18" x 24" x 48". Volts—220 and 440.

A real buy for somebody. Write us today.

FOR SALE BY

International Machinery Co., 3178 Bellevue Ave., Detroit, Mich.

MILLS

No. 3 Van Norman, s. p. d.

No. 3 Cincinnati univ. comp., cone.

No. 4 Cincinnati pl. or vert. s. p. d.

No. 3 Cincinnati plain, s. p. d.

GRINDERS

Nos. 1, 2, 3 Brown & Sharpe univ.

No. 11 Brown & S. plain, s. p. d.

No. 2 Diamond surface, m. d.

84" Diamond face m. d.

14" Pratt & W. vert., b. b. spindle.

Rivett & Heald internals.

16" Heald rotary, m. d.

DRILLS

No. 2B Edlund three spindle, power feed.

Two-spindle Leland & Gifford.

One and two spindle No. 2 Colburn.

No. 363 Barnes all geared.

C12 Natco multiple.

No. 30 Natco multiple, round head.

MISCELLANEOUS

Ing.-Rand air compressor, 880 cu. ft.

15" Gleason spiral finishers.

6x60 Brown & Sharpe gear cutter.

11"x16" Gleason straight tooth.

16x6 Hamilton lathe, grd. hd. m. d.

18x8 Hendey lathes.

No. 3A Warner & Swasey.

No. 4 Warner & Swasey universal

No. 1A Warner & S. bar & chuck (2)

8-ton General flexible press, m. d.

P-4 Farracute punch press.

No. 2 alligator shear, m. d.

3/16" Schuster wire straightener,

cut-off, m. d.

75 k. w. Federal butt welder, 440 v.

Gibbs seam welder.

FOR SALE BY

Brown Machinery Co.,

2333 N. 9th St., St. Louis, Mo.

Brake, Chicago Steel, 8' 18 gauge.

Drills, 14, 16, 20, 22, 24 & 42"

Drills, radial, 2, 3 & 4' American, triple purpose.

Gear hobbors, G. & E. 12" & 24".

Grinders, cylindrical, 10x30" Norton,

12x36" Modern, self-contained.

Grinders, disc, No. 41-20 Besly, m.

d.; No. 6-20 Besly; No. 220 Badger

automatic.

Groover, power, 6' horn.

Hammers, vertical 40 & 80-lb. Per-

fect; 75-lb. Dupont; 130-lb. Justice.

Lathes, 16"x6" & 8" Monarch q. c. g.;

16"x8" Monarch grd. head m. d.;

18"x12" American grd. hd., taper &

turret attach.; 20"x8" LeBlond,

heavy, q. c. g.; 26"x12" Putnam,

taper attach, 36"x18" Niles q. c. g.

Lathes, turret, all sizes.

Millers, plain, No. 1 1/2 American;

No. 3 Brown & Sharpe; No. 3B

Owen vert. attach.; No. 3 1/2 Fox;

No. 2B & No. 3B Milwaukee.

Millers, universal, No. 2 Hendey-

Norton; Lincoln type, No. 4

Hendey; slab, Briggs type No. 11.

Planer, 42"x42"x10' Pond.

Presses, straight side, No. 73 Swaine;

No. 7 Zeh & Hahnemann; No. 68F

Niagara; No. 92 1/2 H. Toledo; No.

408B Bliss toggle.

Presses, o. b. i. Nos. 5 & 6 Consoli-

dated comb. grd.; Nos. 1, 2, 3, 4

Loshbough-Jordan; No. 33 Swaine

Punches, sgl. end, Cleveland "C"

26" thr. 1/4" in 1/4"; Rock River Style

L. rapid action, 24" thr. 1/4" in 1/4";

No. 6 L. & A. 24" thr. 1/4" in 1/4";

No. 7 L. & A. 10" thr. 1/4" in 1/4".

Punch & shears, double end, No. 9C

Beloit 12" thr. 1/4" in 1/4"; No. L-10

Badger 10" thr. 1/4" in 1/4".

Riveters, No. 5A High Speed 1/4" cap.;

Grant 1/4"; Allen jaw riveter.

Screw machines, No. 2 1/2 P. & W.;

1x15" P. & W.

Seamer, double, Swaine hand, 24 ga.

Shapers, 20" Columbia & Queen

City; 24" Ohio.

Shear, sq. 50" Excelsior, gap 10 ga.

Shear, rotary bevel, 1/4" Lennox.

Welders, 20k. w. Agnew; 5k. w. Dyer.

Welder, butt, Federal, 25 cy., 440 v.

USED AND REBUILT MACHINERY

FOR SALE BY

Chas. L. Molitor Machinery Co., 120-124 S. Clinton St., Chicago, Ill

QUICK CHANGE GEAR LATHES

14"x6' Rockford taper draw. att.
14"x6' Monarch.
16"x6' Lodge & Shipley tap. att.
16"x6' Sundstrand tap. draw. att.
16"x6' LeBlond taper att.
16"x6' American.

16"x8' Cincinnati.
16"x8' Bradford taper att.
16"x8' Pratt & Whitney tap. att.
18"x8' Reed-Prentice grd. head.
20"x17' Oliver taper attachment.
18"x8' Reed Prentice auto. (new).

MILLING MACHINES

No. 3 Kempsmith universal.
No. 3B Becker-Brainard universal.
No. 14 Becker-Brainard universal.
No. 4 Oesterlein rapid production.

No. O. Y. B. & S. inclinable div. hd.
No. 3 Becker, No. 3 Bristol vertical.
8" Pratt & Whitney automatic (2).
Whitney, Burke, Chicago, U. S.

SCREW MACHINES

No. 4 Warner & Swasey universal.
Nos. 4 & 6 W. & S. b. g., f. h.
No. 4 W. & S. open hex. turret.
No. 3 W. & S. Fox turret lathe.
No. 1B. Foster turret lathe with auto. chuck and bar feed.

No. 6 Brown & Sharpe screw mche.
19" Foster, geared friction head, 24" capacity.
19" Foster, grd. fr. hd. turret lathe, power cross feed, 24" hole.
Cock grinder, W. & S., sgl. spdle.

MISCELLANEOUS

48" Cleveland openside planer.
30" Fostick 4' American radials.
18"x8' Reed Prentice auto. lathe.
No. 216 Baker, No. 5 taper drill.
14" cup. wheel 24" disc, d. c. motor driven Diamond grinder.
13" Brown & Sharpe gear cutters.
19" Peerless power hack saw.

Rockford 42"x5' balancing wheel.
Turner 4 spdl. vert. boring chucking machine, model C-2.
3 spindle 24" Rockford drill.
No. 3 Wilmarth & Morman grinder.
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22"x10" Davis.
28"x14" Reed Prentice, M. D.

PLANERS

30"x30"x12" Cleveland openside.
32"x32"x12" Niles.
36"x36"x8" Gray.
36"x36"x10" Cincinnati.
36"x36"x12" Woodward & Powell.
42"x42"x12" Cleveland openside.

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Nos. 216, 314, & 417 Baker.
21", 24", 28" & 42" Cincinnati.
Nos. 13, 14 & 30 Natco.
4", 5", 6" & 8" Western radial.
3" & 4" Mueller radial.
No. 3 Aveymatic.

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18H & 24H Gould & Eberhardt.
No. 12 Barber Colman.
Nos. 6, 7, 75 & 715 Fellows.
14" No. 5A Lees Bradner.
No. 3 & 4 Brown & Sharpe.
6" Gleason bevel.
No. 2 Hilton gear miller.

PRESSES

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Nos. 55, 56 & 57½ Toledo.
150 ton Ferracute coining.
800-ton Bliss coining.
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Nos. 3, 4½ & 5 Canco O. B. I.
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Roller Bearing, Complete.
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16"x6" Sundstrand, q. c. g. belted a. c. m. d.
14"x6" Bradford, t. a., draw bar q. c. g.
14"x6" Hendey, q. c. g., taper attach.
9" Sundstrand Prod., g. h., draw-in-att.
16" Prybil Spinning B. B.

Shapers

32" Gould & Eberhardt, b. g., s. p. d.
28" Rockford, back geared.
24" Milwaukee, back geared.
20" Gould & Eber., b. g., heavy duty.
16" Whipp, back geared.
Rhodes Vert. Slotter, 3½" str. rot. tbl.

Grinders

No. 11 Brown & S., plain cylinder.
No. 1 Norton Univ. tool & cutter.
No. 2 Oakley Tool & Cut., Pwr. Fd.
8" Heald rotary surf., magnetic chuck.

Milling Machines

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No. 3 Kemps. Univ. fully equipped.
No. 2A B. & S. Univ. s. p. d. fully eq.
No. 2 Rockford Plain, s. p. d.

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No. 2 Walsh, o. b. i., 2" stroke.
No. 39 Bliss horning, 2" stroke.
No. 22 Rock. horn. swing tbl., 1½" str.
No. 5 American Can Sol. Back, 2" str.

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4 Spdl. Prentice, b. b.
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2 Spindle, No. 2 Avey b. b.
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42" Foundry Rattler, $7\frac{1}{2}$ H. P. Motor	200.00

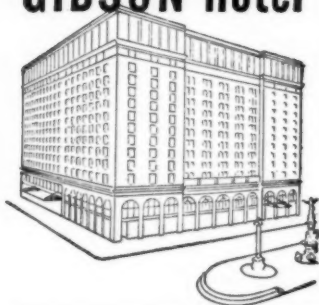
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8" capacity Acme.

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No. 2 Open Back Incluable.

No. 5-A Willard. Open Back Inc.

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OSBORNE & SEXTON

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COLUMBUS

Dept. H.

COMPANY
OHIO

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72" Niles-Bement-Pond.

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42"-36"-24" Bullard New Era

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Nos. 1 & 2 Barret Horizontal Cyl-

inder Bore.

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Nos. 4, 3 & 2 Cincinnati Vertical.

No. 4 Cincinnati Universal, S.P.D.

No. 2 Cincinnati Universal, cone.

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12" Heald Rotary Grinder and 16" Persons-Arter Rotary Grinder.

No. 16 Blanchard Vertical Grinder.

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- 48" Colburn, Power Rapid Traverse.

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- No. 2 Kempnith Maxi-Mill, P.R.T.
- Becker Vertical Miller, Model C.

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- 18" Cincinnati Duplex Milling Machine, motor drive.
- 6" Cincinnati Bickford Plain Radial, gear box, motor drive.
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 Press, dbble. crank, 68F Niagara, 6" st., 84" bet. upr., tie rod.
 Press, double crank, No. 27D Bliss gap.
 Press, No. 6 Niagara OBI., B. G., 5" stroke.
 Press, 100 ton Niles hydraulic, m. d., with pumps.
 Prec. Tool Room bench lathes & milling mchs., comp., all m.d.
 Punches, single end Cleveland, 48" thr., arch jaw, m. d.
 Rolls, No. 5 H & J., 60" thr.; 10' $\frac{3}{8}$ " Bertsch Init. type 3 roll dr., m.d.
 Shear, No. 4 Dolger & Kirsten, alligator.
 Shear, power, 12', $\frac{3}{8}$ " m. d., 36" gap.
 Shear, power, 10' $\frac{3}{8}$ " Chicago Steel.
 Shear, power, 10' $\frac{3}{16}$ " Niagara.
 Spinning Lathes, No. 6 Bliss, 27/60 Pryibil.
 Stake Riveter, 58" throat.
 Universal Iron Worker, Schatz 6x4x $\frac{1}{2}$ " angles.
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 1-No. 2 Brown & Sharpe Cone Drive Universal, old type.
 1-No. 2 Cincinnati Cone Drive. Universal, with c/s.
 1-No. 2 Cincinnati Plain, single pulley.
 1-No. 2-A Manufacturing Type Kearney & Trecker pl. dbl. arm, sgl. pul.
 1-No. 2-B Brown & Sharpe Plain motor drive, with motor.
 1-No. 3-GH LeBlond Heavy Duty Plain single pulley drive.
 1-No. 3 Brown & Sharpe Cone Drive Plain with c/s.
 1-No. 4 Cincinnati Vertical single pully drive.
 1-No. 4 Cincinnati Vertical feed in knee, 84" table.
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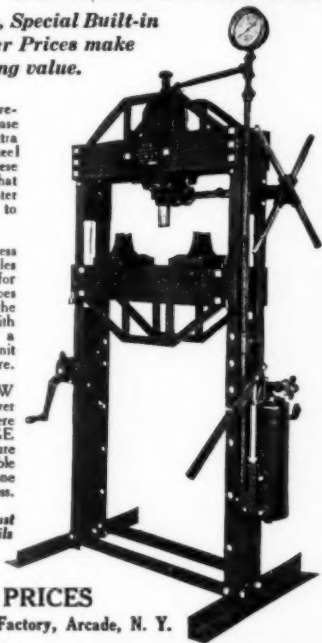
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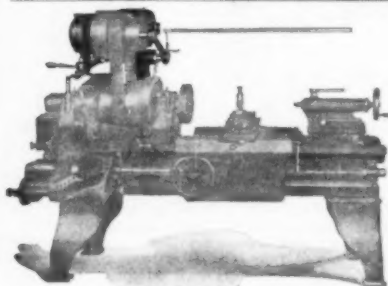
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